Factors influencing Vietnam's rice export to Europe

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ABSTRACT
Vietnam is known as one of the biggest rice exporters in the world but its export value is not high and increases slowly. Rice importing partners of Vietnam are many world's biggest trading partners, such as America, Japan, China, Europe,…Especially, Europe is a great potential import market but Vietnam has not been able to exploit it effectively. Therefore, this paper examines the factors affecting the rice export activities of Vietnam into the European market. The series panel data of bilateral trade from 2000 to 2019 and the gravity model are used to estimate the export activities of rice. The results have revealed that the gross domestic product of Vietnam, the exchange rate of European countries (in VND/USD), institute quality of Vietnam positively affect the flow of rice trade; while per capita income of European countries, exchange rate of Vietnam (in USD/VND) and the geographical distance between Vietnam and importers impact negatively.

Keywords: *rice export activities, Vietnam, European market, gravity model*

1. INTRODUCTION

Vietnam's rice exporting activities has achieved impressive achievements since Vietnam officially participated in the international market in 1989. For the past 10 years, Vietnam has been one of the three largest rice exporting countries in the world with more than 150 destinations [1]. It has contributed positively to economic growth, brought in a large source of foreign currency revenue, increased income, and improved the quality of life for the majority of farmers. Although the amount of rice export volume accounts for about 15% of the world total's figure, the value is not high because Vietnam still focuses on low-end markets [2]. The main destination of Vietnam is Asia with more than 50%. It means Vietnam is dependent on specific markets, while other potential markets aren't paid good attention to, such as Europe. Moreover, according to the Export Potential Map (2020), the rice export potential turnover from Vietnam to Europe is 331.5 million USD, but the actual export turnover is only 32.9 million USD, which is still $298.1 million has not yet been mined. Facing that situation, the factors which affect Vietnam's rice exports to Europe and their levels need to be researched. Moreover, how to take advantage of opportunities to overcome challenges, overcome the limitations of the industry, and increase rice exports effectively is a problem that needs to be solved.

In addition to practical problems, research about Vietnam's rice exports to Europe lacks specificity. Firstly, most of the previous researches only mentioned the general export, or agricultural products (including many commodities such as coffee, pepper, cashew, ...); few studies have focused on only rice. Secondly, the researches related to the European market are still limited. Thirdly, the research about Vietnam's rice exports is not only limited but also inverse, leading to difficulties for businesses and policymakers. Finally, in the context of globalization with

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many new-generation free trade agreements being signed, some studies are outdated, leading to results and recommendations losing practicality.

For those reasons, the article with the topic "Factors affecting Vietnam's rice exports to the European market" will contribute to diversifying domestic studies. The article analyzes the factors affecting the export of rice from Vietnam to Europe. The data used in the research from 2000 to 2019. Some other information is updated until October 2020. Furthermore, in addition to the use of regression techniques such as Pooled OLS, FEM, and REM, the article also adds the GMM estimation to solve the phenomenon of variable variance and endogeneity in the model, which most previous studies have left open.

2. LITERATURE REVIEW

Many empirical studies on the effects of rice exports on economic development have been carried out. Malhotra et al (2017) argued that export activities play an important role in the development and economic growth of a country, thereby helping to improve the socio-cultural life of the people. As a result, countries are forced to participating in international trade and find ways to increase their market share [3]. In particular, the export of agricultural products will help create competitive advantages for emerging economies, such as Vietnam when participating in the international trade market [4]. Dawson (2005) has studied that agricultural exports have a positive effect on economic development based on panel data of 62 developing countries from 1974 to 1995, but the level of the effect depends on the agricultural structure of the country. So, factors affecting agricultural products depends on the specific research context.

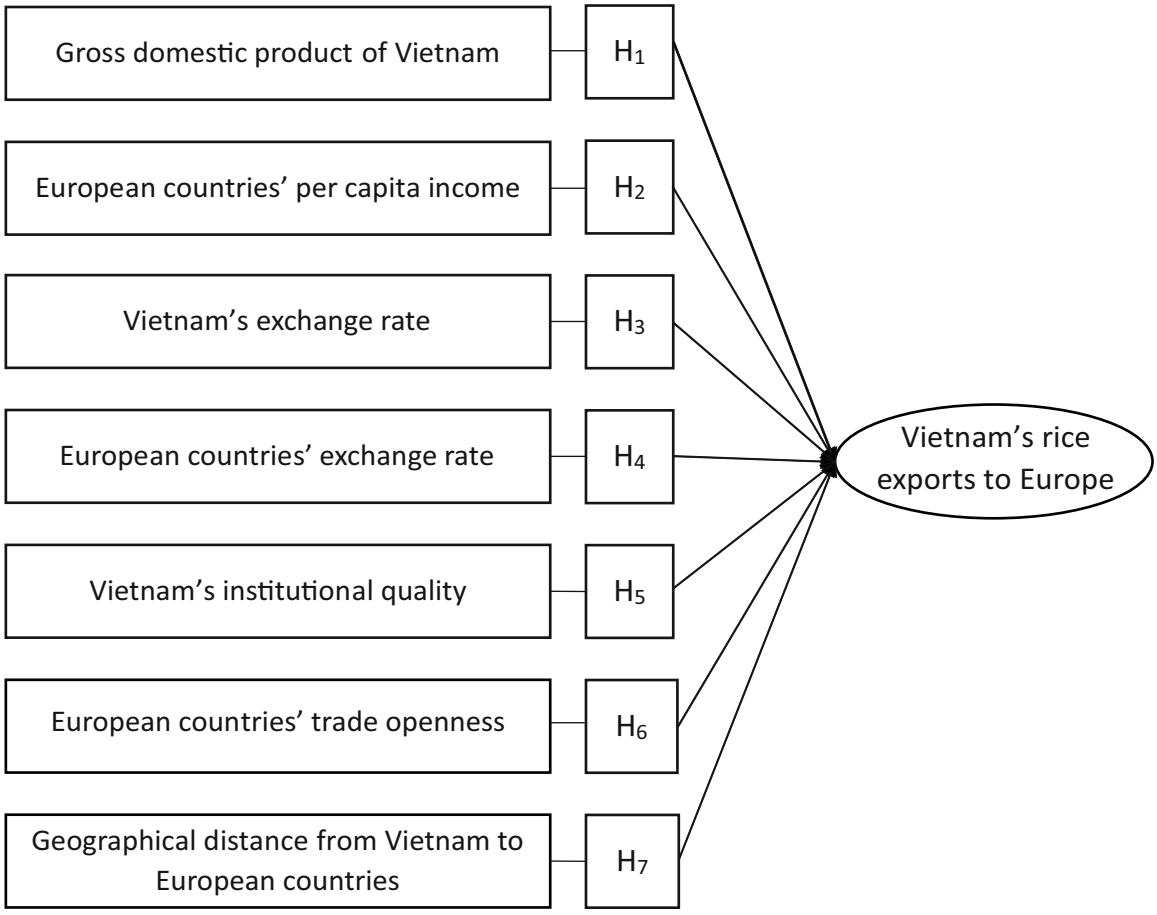

Figure 1. Factors influencing Vietnam's rice exports to European countries

However, most of the previous researchers have pointed out that factors that have significant impacts on bilateral agricultural trade flows include gross domestic product (GDP), per capita income, exchange rate, institutional quality, trade openness and geographical distance [2, 4, 5]. So, the authors propose a model of factors affecting Vietnam's rice exports to the European market as figure 1 and table 1.

Table 1. Empirical researches

Variable	Empirical researches
Vietnam's GDP	Ahmad and Garcia [6], Apostolov and Josheski [7], Ehsan [4], Ngo Thi My and Tran Nhuan Kien [8], Rallatou and Tzouvelekas [9]
Per capita income of European countries	Irshad et al. [10], Kashiwagi et al. [11], Do Thi Hoa Nha and Nguyen Thi Thu Ha [12]
Vietnam's exchange rate (USD/VND)	Ahmad and Garcia [6], Bhalla [13], Feng et al.[14]
European countries' exchange rate (VND/USD)	Bui and Chen [15], Do Thi Hoa Nha and Nguyen Thi Thu Ha [12]
Vietnam's institutional quality	Groot et al.[16], Do Thi Hoa Nha and Nguyen Thi Thu Ha [12], Wondesen and Fekadu [17]
European countries' trade openness	Babatunde and Adetunji [18], Feng et al.[14], Ngo Thi My and Tran Nhuan Kien [8], Wondesen and Fekadu [17]
Geographical distance between Hanoi (capital of Vietnam) and importers' capitals	Ahmad and Garcia [6], Malhotra et al.[19], Mussa and Ramakrishna [20], Do Thi Hoa Nha and Nguyen Thi Thu Ha [12], Ngo Thi My and Tran Nhuan Kien [8], Wondesen and Fekadu [17]

3. DATA AND METHODOLOGY

3.1. Data

The panel data contains 920 observations of Vietnam and 46 European countries is collected from trusty sources, such as Trade Map, World Bank and FreeMapTools. 46 European countries are Albania, Andorra, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom. The data is taken in long-term period, from 2000 to 2019. It helps to make more accurate assessments.

3.2. Research model

Based on empirical researches [3, 8, 11, 14, 16, 17], the article analyzes the factors affecting Vietnam's rice exports to the European market based on a gravity model can be formulated as follows:

$$\ln EXP_{VNjt} = \beta_0 + \beta_1 \ln EXP_{VNj,t-1} + \beta_2 \ln GDP_{VNt} + \beta_3 \ln INC_{jt} + \beta_4 \ln ER_{VNt} + \beta_5 \ln ER_{jt} + \beta_6 \ln IQ_{VNt} + \beta_7 \ln OI_{jt} + \beta_8 \ln DIST_{VNjt} + \varepsilon_{VNjt}$$

Where: VN is Vietnam; j is European countries; EXP_{VNjt}: the value of Vietnam's rice export to country j in year t; GDP_{VNt}: GDP of Vietnam in year t; INC_{jt}: per capita income of country j in year t; ER_{VNt}: real exchange rate (USD/VND) of Vietnam in year t; Erjt: real exchange rate (VND/USD) of country j in year t; IQ_{VNt}: Vietnam's institutional quality in year t; Oljt is trade openness of country j in year t, $DIST_{VNjt}$ is geographical distance between the capital of Vietnam to country j; βi

denotes the coefficients that present the impact of factor i in this model and ε_{VNj}: error term.

4. RESULTS

The study has performed the tests and conducted the regression according to the steps (appendix). The final regression results are shown in table 4. Table 4 describes the results of model regression with three estimation methods Pooled OLS, FEM and GMM. The regression coefficient β1 of lnEXPVNj, t-1 in the Pooled OLS estimate is 0.55, in the FEM estimate is 0.32. This confirms that the estimate of lagged rice exports in the Pooled OLS is skewed while this estimate in the FEM is skewed. Consistent with the original forecast, the estimate of lnEXPVNj, t-1 by GMM lies between the two estimates in Pooled OLS and FEM, equal to 0.52 statistically significant at 1%. The GMM regression has a smaller number of instrumental variables than the number of countries, so the problem of amplifying the Hansen test due to an increase in the number of instrumental variables is not a concern. Hansen's test gives a value of 0.22 (> 0.1), so there is no basis to reject the hypothesis H0, in other words, the instrumental variables included in the model are strictly exogenous and considered valid. Next, the Arellano - Bond test shows that, AR (1) = 0.00 (< 0.1), which means that the hypothesis H0 is rejected, which means that there is an autocorrelation of the error in the difference. order 1. However, the result AR (2) = 0.46 (> 0.1) should accept the hypothesis H0, that is, there is no autocorrelation of error in the second difference. Thus, the test Hansen's determination, AR (1), AR (2) shows the appropriateness of the instrumental variables and the two-step systematic GMM estimation method.

Table 4. Estimation results

Independent variables	Pooled OLS	FEM	GMM
	lnEXP	**lnEXP**	**lnEXP**
$lnEXP_{VNj,t-1}$	0.55^{***}	0.32^{***}	0.52^{***}
lnGDPVN	0.88^{***}	1.2^{*}	1.16^{***}
lnINC	-0.13	0.38	-1.40^{**}
lnERVN	-0.69	0.07	-1.23^{**}
lnER	0.88	0.05	0.58^{***}
lnOI	-0.40	0.77	0.19
lnDIST	-4.10^{*}	0	-10.75^{***}
Intercept	57.89	-17.89	142.74^{***}
Observations	920	920	920
Instrumental variables			44
Number of countries			46
Coefficient	0.56		
Hansen test			0.22
AR test (1)			0.00
AR test (2)			0.46

*,**,***Significant at 10, 5 and 1 percent levels

The article tests the robustness of the GMM method in the end. The results show that in both GMM and FGLS estimation methods, the factors: GDP of Vietnam, per capita income of European countries, exchange rate of Vietnam, exchange rate of European countries, the institutional quality of Vietnam and the geographical distance between Vietnam and European countries all have an impact on Vietnam's rice exports to this market. For detail:

Firstly, about Vietnam's GDP. This factor has a positive impact on Vietnam's rice export turnover to the European market at 1% significance level. Thus, hypothesis H1 is accepted and this result is similar to many experimental results of [1, 4, 6, 8, 17, 21]. Specifically, in terms of other variables unchanged, when Vietnam's GDP increases by 1%, Vietnam's rice export turnover to Europe increases by 1.16%. Thus, Vietnam's GDP is an important factor in the model. GDP represents the size of Vietnam's economy. As the size of the economy increases, Vietnam's production resources become more abundant, and the ability to produce high-quality rice also increases. In particular, the European market is always considered the most demanding market because it always requires high quality and certification, has strict import standards with many regulations on technical barriers, banned substances, pesticide residues,... The demand of this market is high-grade rice, strict requirements from quality to environmental protection standards, and the reputation of exporters. Meanwhile, in the past, Vietnam has often exported rice of medium quality, has not yet created its own brand in the international market, so it is facing many difficulties when penetrating into Europe. Therefore, the increase in GDP helps Vietnam to increase access to modern technology and production techniques, invest in research into new rice varieties with higher quality and yield. Thereby, helping to increase Vietnam's rice export turnover to European countries.

Second, about the per capita income of European countries. This factor has a negative impact on Vietnam's rice export turnover to the European market at 10% significance level. Thus, hypothesis H2 is rejected and this result is similar to the empirical study of [6] on factors affecting rice exports of Pakistan. Specifically, holding all other variables constant, a 1% increase in per capita income of European countries will reduce bilateral trade flows for rice by 1.4%. This result shows that rice is a common commodity. Therefore, consumers will tend to maintain or reduce the consumption of this item and increase the consumption of luxury products. Meanwhile, Europe, although small in area and population, is always known as a prosperous economy when most countries have a GDP and a higher standard of living than most other countries in the world. In the period 2000 - 2019, the per capita income was US$30,346/person/year. Therefore, the increase in income further reduces the need for rice imports in rich countries like Europe.

Third, about Vietnam's exchange rate. This factor has a negative impact on Vietnam's rice export turnover to the European market at 5% significance level. Thus, hypothesis H3 is rejected and this result is different from most previous experimental studies. However, this opposite effect is similar to the results in the study of [24]. Specifically, holding all other variables constant, a 1% increase in Vietnam's exchange rate will reduce bilateral trade flows for rice by 1.23%. This level of impact is quite high, showing that the exchange rate plays an important role in Vietnam's rice exports. This result can be understood that the increase in the exchange rate of Vietnam leads to exchange

rate instability. Meanwhile, the European market is a market that not only cares about the price factor but also focuses on the stability of the currency and the associated risks in international payments. In particular, in order to produce high-quality rice that meets European standards, Vietnamese farmers and businesses must apply advanced technologies and techniques imported from abroad, production and export processes as well. cost more. Therefore, the devaluation of the domestic currency reduces the commercial motivation of farmers and exporters. Thus, an increase in Vietnam's exchange rate will contribute to a negative impact on rice exports to the European market.

Fourth, about the exchange rates of European countries. This factor has a positive impact on Vietnam's rice export turnover to the European market at 1% significance level. Thus, hypothesis H4 is accepted and this result is similar to the experimental study of [8, 15]. Specifically, holding all other variables constant, a 1% increase in the exchange rate of partner countries will increase bilateral trade flows for rice by 0.58%. The exchange rate of the partner countries is directly related to the price of imported rice. As the exchange rates of these countries rise, their currencies are depreciating. Theoretically, they would reduce their rice imports. However, because Vietnam's currency value is still much lower than that of European countries. Therefore, this devaluation is insignificant. Thus, the increase in the exchange rate of European countries still has a positive impact on Vietnam's rice export turnover to this market.

Fifth, on the institutional quality of Vietnam. This factor has a positive impact on Vietnam's rice export turnover to the European market at 1% significance level. Thus, hypothesis H5 is accepted and this result is similar to experimental studies of [12, 16, 17, 23]. Specifically, holding other variables constant, a 1% increase in Vietnam's institutional quality will increase bilateral trade flows for rice by 7.76%. Thus, this factor has a very high level of impact, requiring policy makers to focus on exploiting more. A country with good institutions is associated with freedom of speech, freedom of association of citizens, a stable political and economic economy, efficient government, and rules and regulations. enforcement is ensured and corruption is controlled. Therefore, the higher the institutional quality, the healthier the business environment will be created, ensuring that the interests of each entity participating in the economy are always protected. Since then, this factor has become a driving force for farmers and businesses to increase production and export. In addition, a country with good institutions also builds trust in partners. In particular, Europe is always associated with the characteristic of being a difficult market, not only with high requirements for goods quality, but also for factors related to documents, procedures, legal system, environment. of the exporting country. Therefore, the higher the institutional quality of Vietnam, the more favorable conditions for rice farmers and enterprises to meet the requirements of partners. Thus, the increased institutional quality of Vietnam has a very positive impact on Vietnam's rice export turnover to the European market.

Sixth, about the trade openness of European countries. This factor has no impact on Vietnam's rice export turnover to the European market. Thus, hypothesis H6 is rejected. This result is different from most previous empirical studies, but this result is consistent with the actual situation in the trade relationship in rice between Vietnam and Europe. In the period 2000 - 2019, European countries still tend to

protect their domestic agriculture, so the level of trade openness is not high. The rigor in rice quality requirements, posing many technical barriers, requiring many documents, requiring rice to be certified as Organic, Global Gap, etc. are concrete proofs of openness. of this market is not high. Besides, Vietnam often produces rice in small, fragmented forms, with little application of technology in production, failing to meet these strict requirements, so in the past twenty years, we have mainly exported to markets. easier markets such as Asia and recently expanded to Africa. Thus, the trade openness of European countries has not had an impact on Vietnam's rice export turnover to this market.

Finally, about the distance between Vietnam and European countries. This factor has a negative impact on Vietnam's rice export turnover to the European market at 1% significance level. Thus, hypothesis H7 is accepted and this result is similar to the experimental studies of [6, 8, 12, 17].

Specifically, holding other variables constant, a 1% increase in the distance between Vietnam and partner countries will reduce bilateral trade flows for rice by 10.75%. Thus, this factor has the highest level of impact, requiring policy makers to pay special attention. Currently, the quality of the transport system is improving, but to export rice to Europe, it must go by sea. This is the most risky mode of transport, while the geographical distance between Vietnam and Europe is much farther than Asia or Africa. The greater the distance, the higher the transportation costs and risks. Therefore, the distance has a negative impact on Vietnam's rice exports to the European market.

5. CONCLUSION

The main purpose of this research was to identify and evaluate the factors that affect Vietnamese rice exports to European countries. To solve this problem, the authors conducted an analysis based on panel data of 46 European countries over the 20 years from 2000 to 2019. Regarding the research model, the gravity model is a popular theoretical model. to explain trade flows between countries over decades. In general, this model is consistent with most empirical observations, so it has become a commonly used tool in the world of economics. Regarding estimation techniques, in addition to conventional techniques such as Pooled OLS, FEM or REM, the authors also updated the two-step system GMM technique. This technique helps to solve the problem of endogeneity, autocorrelation as well as variable variance. Thereby, the authors come to some conclusions related to the influencing factors in the model. On the side of the exporting country, Vietnam, GDP and institutional quality have a positive impact on rice exports to Europe while the exchange rate has a negative impact. On the side of the importing country, which is the European market, per capita income has a negative impact, while the exchange rate has a positive effect, and the trade openness is not statistically significant. Besides, the distance between Vietnam and these countries has a negative impact. Overall, the results of this study are consistent with most of the previous studies. This similarity is reasonable according to economic theory. Particularly, the trade openness factor of European countries has no explanatory significance in the model, and this result is different from previous studies. This difference is explained by the actual trade situation between Vietnam and Europe. Because in the period 2000 - 2019, Vietnam has not taken Europe as the destination of rice exports. Therefore, the EU's trade openness has not had much impact on Vietnam's rice

export turnover. This study also has some limitations. It is limited in the data, as other periods in the world have not been observed and included in the research. In the future, a study with large-scale data of time should be conducted, which will certainly give a universal result and fewer errors. However, this paper, in our opinion, provides the significant result and may help the government and policy makers to undertake appropriate measures to improve and promote the export of Vietnamese rice to the European markets.

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Những nhân tố ảnh hưởng đến hoạt động xuất khẩu gạo của Việt Nam sang thị trường châu Âu

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TÓM TẮT

Việt Nam được biết đến như một trong những quốc gia xuất khẩu gạo hàng đầu thế giới nhưng giá trị thu về không cao và tăng trưởng chậm. Các đối tác nhập khẩu gạo của Việt Nam là nhiều đối tác thương mại lớn nhất thế giới như Mỹ, Nhật Bản, Trung Quốc, châu Âu,… Đặc biệt, châu Âu là thị trường nhập khẩu tiềm năng lớn nhưng Việt Nam chưa khai thác hiệu quả. Do đó, bài báo này nghiên cứu các yếu tố ảnh hưởng đến hoạt động xuất khẩu gạo của Việt Nam vào thị trường châu Âu. Nghiên cứu sử dụng mô hình trọng lực phân tích dữ liệu bảng về thương mại song phương từ năm 2000 đến năm 2019. Kết quả cho thấy, tổng sản phẩm quốc nội của Việt Nam, tỷ giá hối đoái của các nước châu Âu, chất lượng hàng hóa của Việt Nam ảnh hưởng tích cực đến dòng chảy thương mại

gạo. Trong khi thu nhập bình quân đầu người của các nước châu Âu, tỷ giá hối đoái của Việt Nam và khoảng cách địa lý giữa Việt Nam và các nhà nhập khẩu tác động tiêu cực.

Từ khóa: *hoạt động xuất khẩu gạo, Việt Nam, thị trường châu Âu, mô hình trọng lực*

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