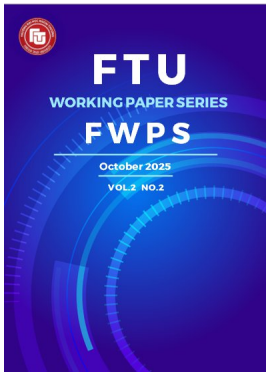

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TÁC ĐỘNG CỦA HIỆP ĐỊNH EVFTA ĐỐI VỚI VIỆC XUẤT KHẨU CÁ TRA CỦA VIỆT NAM SANG CÁC NƯỚC EU: PHƯƠNG PHÁP TIẾP CẬN BẰNG MÔ HÌNH TRỌNG LỰC

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Tóm tắt

Bài nghiên cứu đánh giá tác động của Hiệp định Thương mại Tự do EU-Việt Nam (EVFTA) đối với xuất khẩu cá tra của Việt Nam sang EU, sử dụng dữ liệu bảng từ 22 quốc gia trong 6 năm từ 2018 đến 2023. Các tác giả đã sử dụng phương pháp Feasible Generalized Least Squares để định lượng tác động của các biến độc lập. Kết quả nghiên cứu cho thấy các yếu tố như GDP, khoảng cách địa lý và độ mở thương mại có ảnh hưởng tích cực đáng kể đến xuất khẩu cá tra của Việt Nam sang EU. Ngược lại, sự biến động tỷ giá hối đoái có tác động tiêu cực đến thương mại, trong khi

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việc thực hiện EVFTA, mặc dù đã giảm thuế quan, vẫn gặp phải những thách thức do các rào cản phi thuế quan nghiêm ngặt. Dựa trên những phát hiện này, nghiên cứu đưa ra các khuyến nghị chính sách để nâng cao chiến lược xuất khẩu cá tra của Việt Nam, tập trung vào việc cải thiện sự tuân thủ các tiêu chuẩn của EU, nâng cao chất lượng sản phẩm và tăng cường hợp tác giữa chính phủ và doanh nghiệp.

Từ khoá: EVFTA, cá tra, xuất khẩu, Việt Nam, mô hình trọng l

THE IMPACT OF EVFTA ON THE EXPORT OF VIETNAM'S PANGASIUS TO EU: AN APPROACH USING GRAVITY MODEL

Abstract

This study assesses the impact of the EU-Vietnam Free Trade Agreement (EVFTA) on Vietnam's pangasius exports to the EU with panel data from 22 countries over 6 years from 2018 to 2023. The authors utilized the Generalized Least Squares method to quantify the effects of independent variables. The results reveal that factors such as GDP, geographical distance, and trade openness significantly increase Vietnam's pangasius exports to the EU. Conversely, exchange rate fluctuations negatively affect trade, while the implementation of the EVFTA, despite tariff reductions, presents challenges due to stringent non-tariff measures. Based on these findings, the research provides policy recommendations to enhance Vietnam's pangasius export strategy, focusing on improving compliance with EU standards, raising product's quality, and enhancing cooperation between the government and businesses.

Keywords: EVFTA, pangasius, export, Vietnam, gravity model

1. Introduction

Vietnam has established itself as one of the world's largest producers and exporters of pangasius (Pangasius hypophthalmus), a freshwater fish species that plays a vital role in the country's aquaculture sector and economic development. The EU is Vietnam's third-largest seafood export market, after the United States and Japan. According to WTO centre, this market consistently accounts for over 17-18% of the total seafood export value of Vietnam; of which, shrimp products account for 22%, pangasius accounts for 11%, and other seafood products make up 30-35%.

The EU-Vietnam Free Trade Agreement (EVFTA) coming into effect in August 2020, has introduced a new trade dynamic by offering preferential access to the EU market, eliminating, reducing tariffs, and promoting regulatory cooperation. When the EVFTA took effect, many Vietnamese pangasius enterprises hoped to make a significant leap in exports to this large traditional market. This is because many exported pangasius products, such as whole frozen pangasius, fresh and chilled pangasius, fresh and chilled pangasius fish fillets, and frozen pangasius fillets, will have their tariffs reduced to 0%. Processed pangasius products will see a tariff reduction from 14% to 0% within 4 years. With such significant changes, the need for a comprehensive and

reliable study on the effect of this trade agreement on Vietnam's pangasius exports, and recommendations to optimize its benefits, is palpable.

2. European Union - Vietnam Free trade agreement

2.1. Overview

The EU-Vietnam Free Trade Agreement (EVFTA) is a comprehensive trade agreement between the European Union (EU) and Vietnam. Negotiations for the EVFTA began in 2012 and lasted for 4 years.

The EVFTA was officially signed on June 30th, 2019, in Hanoi, Vietnam. The agreement took effect on August 1st, 2020, after receiving approval from both the European Parliament and Vietnam's National Assembly.

EVFTA eliminates most tariffs on goods traded between the two parties, facilitates market access for services and investments, and promotes regulatory coherence. It is expected to create opportunities for businesses, increase bilateral trade, and contribute to economic growth in both regions.

2.2. Main commitments

Tariff Elimination under the EVFTA

Upon the agreement's implementation, the EU will eliminate import duties on approximately 85.6% of tariff lines, covering 70.3% of Vietnam's exports to the EU. Over the next seven years, this elimination will expand to 99.2% of tariff lines, accounting for 99.7% of Vietnam's export value. For the remaining 0.3% of exports, the EU will implement tariff rate quotas with a 0% duty rate within the quota. As a result, nearly all of Vietnam's exports to the EU will benefit from duty-free access within seven years.

Non-Tariff Commitments

Sanitary and Phytosanitary Measures (SPS) ensure food safety and animal and plant health standards align with international regulations. Vietnam commits to harmonizing SPS measures with EU and WTO standards while also accelerating the approval process for EU agricultural exports to Vietnam. The EU prohibits carbon monoxide use in processing certain fish, like pangasius, and sets Maximum Residue Limits (MRLs) for pharmacologically active substances, including antibiotics, in animal-based food products, as outlined in Regulation (EU) No 37/2010.

Technical Barriers to Trade (TBT) must also be complied, including EU regulations on product quality and labelling. A mutual recognition framework for conformity assessment has been established to reduce unnecessary testing and certification costs. Labeling requirements mandate that products accurately state the species name, production method, and origin to meet EU consumer information standards. Packaging compliance is also necessary to ensure materials used are safe and environmentally friendly.

Rules of Origin (ROO) determine whether Vietnamese exports qualify for preferential tariffs. A key concept is wholly obtained origin, which applies to goods entirely produced, harvested, or processed within a country without incorporating foreign materials. This includes animals born and raised, plants harvested, and minerals extracted within Vietnam.

2.3. Vietnam's pangasius export to the EU

2.3.1. Commitments of EVFTA on Vietnam's pangasius export to the EU

Table 1: Tariff on Vietnam's pangasius export

HS code	Description	Base rate	Category
030324	Fish, frozen, excluding fish fillets of catfish (Pangasius spp., Silurus spp., Clarias spp., Ictalurus spp.)	8%	B3
030462	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen (Pangasius spp., Silurus spp., Clarias spp., Ictalurus spp.)	5.5%	B3

Source: Ministry of Industry and Trade of Vietnam (EVFTA – appendix 2 – A – 1)

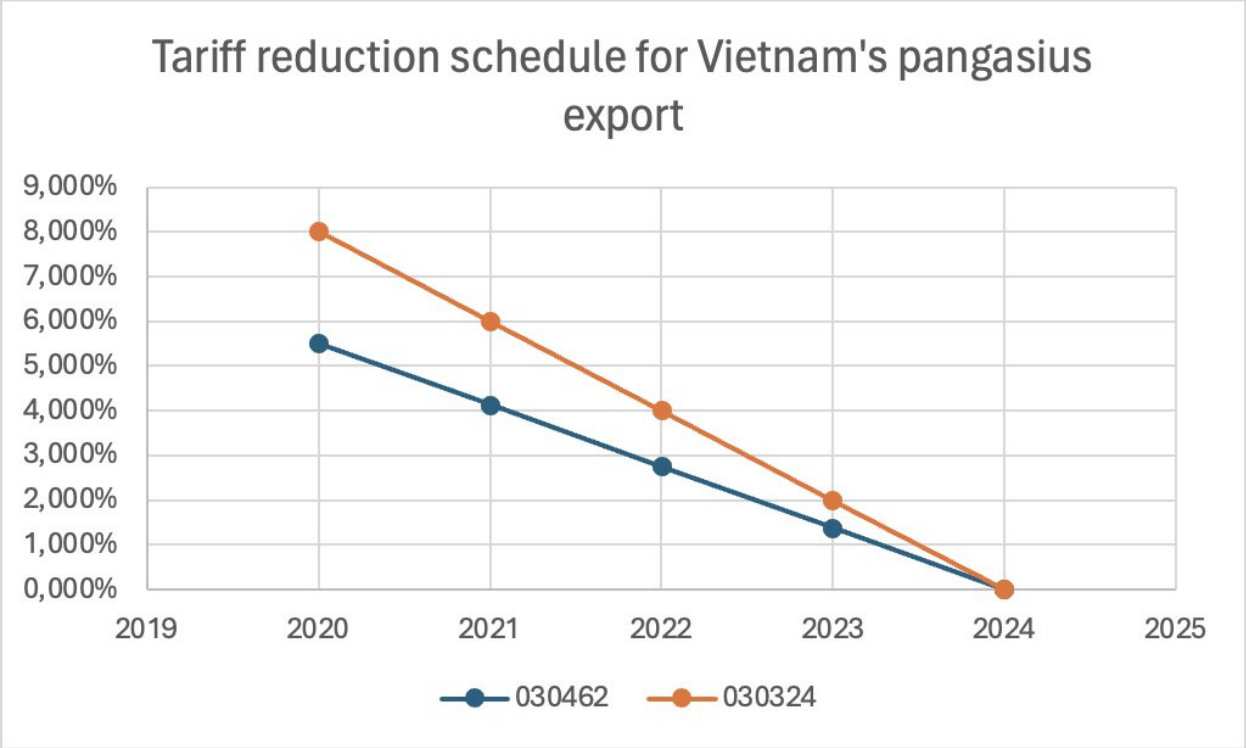

Figure 1: Tariff reduction schedule

Source: Ministry of Industry and Trade of Vietnam (EVFTA – appendix 2 – A – 1)

The tariff reduction schedule for Vietnamese pangasius exports to the EU under the EVFTA agreement from 2020 to 2023 could be seen in the chart. Pangasius filets (HS code 030462), classified in category B3 under EVFTA, have a starting tariff of 5.5% in 2020 and its tariff is to be removed in four equal annual stages following its starting date. Likewise, frozen pangasius, (HS code 030324), also belongs to category B3, has its initial tariff of 8% and is expecting four equal annual reduction stages to 0% in 2024.

2.3.2. Vietnam's pangasius export to the EU under EVFTA

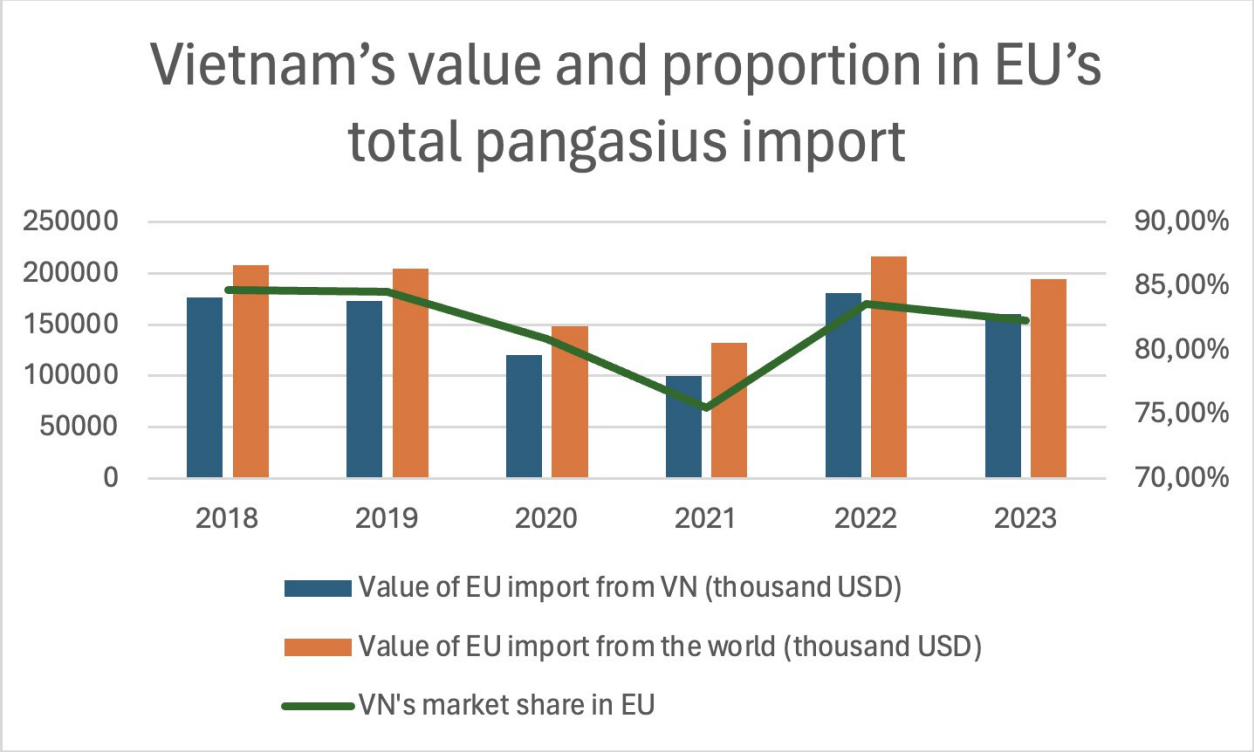

Figure 2: Vietnam's value and proportion in EU's total pangasius import

Source: Authors' calculation from Trade map (2025)

Figure 2 shows Vietnam's export value and proportion in the EU's pangasius imports from 2018 to 2023. Prior to 2020, Vietnam's pangasius export to the EU was valued around 170 million USD. After the EVFTA came into effect, the export value fluctuated considerably, recording the lowest point of 100 million USD in 2022, followed by significant recovery to pre-EVFTA levels in 2022. The value of Vietnam's pangasius export to EU then fell to nearly 150 million USD in 2023. Throughout the period, Vietnam's share in EU's pangasius market was around 85%, with the exception of 75% in 2021.

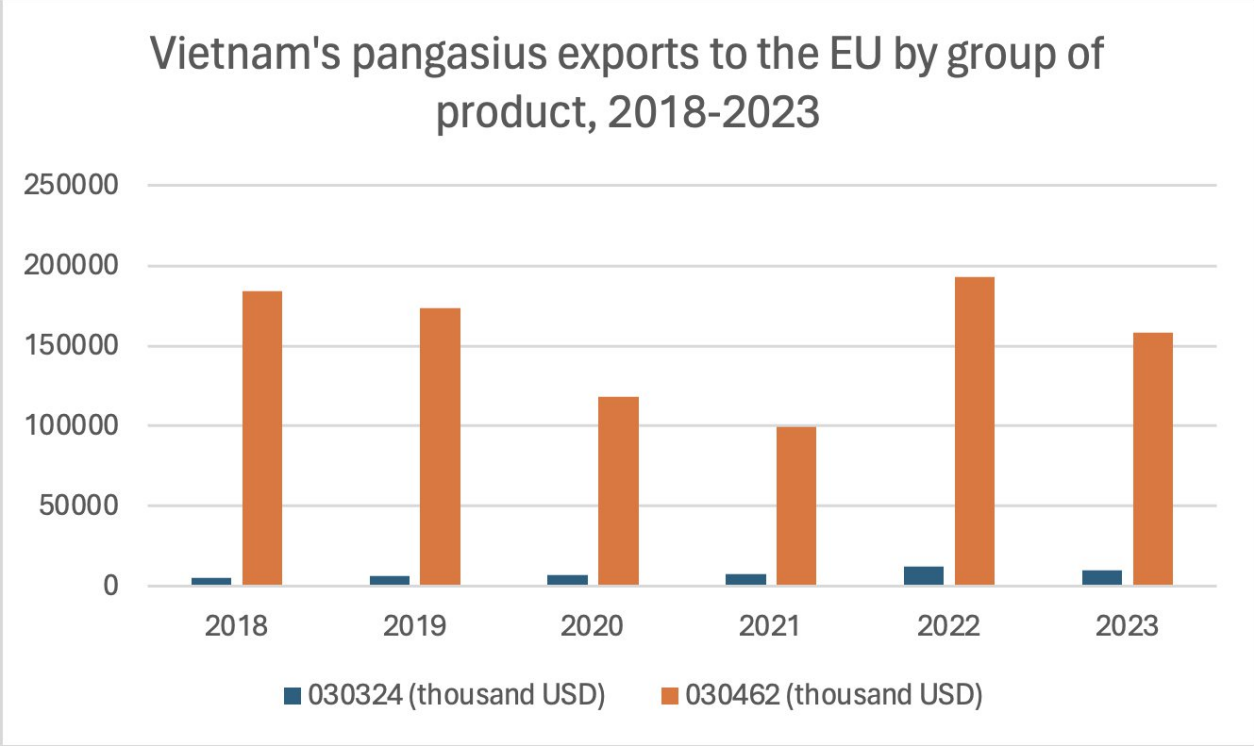

Figure 3: Vietnam's pangasius exports to the EU by group of product, 2018-2023

Source: Authors' calculation from Trade map (2025)

HS code 030462 (pangasius fillets) is the main good category exported to EU markets. Valued around 180 million USD prior to EVFTA, it decreased to nearly 100 million USD in 2021. The data recovered to nearly 200 million USD in 2022 and fell to 150 million USD in 2023.

Export of HS Code 030324 (pangasius, excluding fillets) remained relatively low throughout the period, showing only a slight increase in 2022 before decreasing again in 2023. The product category valued around 7 million USD over the period examined.

3. Literature review

3.1. Previous studies on Vietnam's exports under EVFTA

EVFTA has opened up many opportunities for Vietnam-EU bilateral trade, especially Vietnam's exports of key commodities. Several studies on Vietnam's export activities under EVFTA, predominantly employing the SMART model, has been conducted to demonstrate this view. Chi et al. (2023) used this model with data on export turnover and scenarios of tariff reduction to 0% when EVFTA takes effect and found out that the EVFTA is projected to increase Vietnam's exports by 6.33% during the period from 2019 to 2029, equivalent to over 5.3 billion USD. This

can be attributed to price advantage when partner countries eliminate tariffs for Vietnam. Using the same method, Doan and Nguyen (2021) concluded that the tariff elimination has a significant positive impact on Vietnam's agricultural exports, with the export of fish and seafood products reaping the greatest benefit. However, the conclusion drawn from both research is that Vietnam's price-related competitive advantage should be carefully considered, as in the scenario where the EU lowers the tariff to other competing countries, Vietnam's exports exhibit minor reductions.

The impact of EVFTA on Vietnam's export to the EU is also shown in a few other studies using quantitative analysis. For example, Maryla et al. (2020) had a finding that the full implementation of EVFTA could increase Vietnam's trade flows and boost its exports by 12%. At the industry level, Kikuchi et al. (2018) used the CGE model to assess the economic impact of different regional trade agreements on Vietnam. The sectoral impact indicated that Vietnam's exports of light-manufacturing goods, particularly leather products, motor vehicles, transport equipment, and electronics, will be expanded under EVFTA. Applying gravity model and a panel data analysis, Duong (2016) concluded in his research that a decrease of 1% of EU's tariff /Vietnam's tariff leads to an increase of 0.52% / 0.95% of Vietnam-EU trade. Moreover, Vietnam, under EVFTA, stands a great chance to increase its market share in the EU market for key exports such as textiles, seafood, and footwear.

3.2. Previous studies on Vietnam's pangasius exports under EVFTA

Research into Vietnam's pangasius export, though limited, is also investigated as a key segment in other research on Vietnam's seafood export to the EU.

According to VASEP (2021), EVFTA agreement has a positive impact on seafood exports of Vietnam to the EU as it helps total seafood exports value remain stable during COVID 19 and even witness a sharp increase of 23% in the first 7 months after the pandemic. However, while export prices did not increase, pangasius exports to the EU decreased by 13% because of high input costs (especially logistics, containers, sea) during that period. Similarly, Nga et al. (2022) saw many advantages and opportunities for Vietnam seafood exports to the EU market since the EVFTA Agreement took effect. In terms of export structure, while the export turnover of shrimp and tuna products experienced good growth in the years 2010-2021, the export turnover of pangasius decreased continuously due to information about unsafe quality, lack of sustainability in farming, and labor condition issues related to pangasius products. These non-tariff challenges were also mentioned in the research of Nguyen and Lai (2022). Their finding attributed strict EU regulations

on food safety, the IUU yellow card warning, and increased competition from other seafood-exporting nations to the sharp decline in pangasius exports. Nonetheless, the EVFTA's tariff reductions still present opportunities for growth in Vietnam's pangasius sector, with the tariff for frozen pangasius fillets will be reduced from 5.5% to 0% over four years and the tax rate for pangasius meat will drop from 8% to 0% in the same period under the EVFTA. This opportunity can only be utilized if pangasius products from Vietnam overcome negative perceptions of sustainability and promote the product effectively (Jan et al., 2018).

Apart from those qualitative analysis, the gravity model is a potential framework for evaluating the impact of EVFTA, yet its application remains quite limited, particularly for pangasius. First introduced by Tinbergen (1962) in international trade analysis, this model has been widely used in empirical studies. According to the standard model, bilateral trade between countries is explained by economic size (GDP), population, and geographical distances. Later, many studies in this field incorporated additional variables into the standard model to test their relevance in explaining bilateral trade. For example, Pham and Vu (2014) indicated that the service trade flows between Vietnam and its European partner countries are determined by the GDP per capita gap between Vietnam and EU countries, the population of EU countries, the real effective exchange rates, colonial relationship and being former members of the Council of Mutual Economic Assistance. Meanwhile, the empirical results from the research of Huy (2018) show that the bilateral trade of Vietnam is positively associated with the country's GDP and importing countries' GDP. Furthermore, it has a negative relationship with distance from Vietnam to trading partners and particularly, exchange rate plays a significant role in promoting exports of Vietnam. These results are aligned with findings from other studies of the gravity model by Ngan et al. (2016) and Binh et al. (2014). In addition, Tu et al. (2018) as well as Tran and Vo (2022) used the trade openness of importing countries as another independent variable and both found its positive relationship with Vietnam bilateral export value.

3.3. Research gap

The review of the past literature has identified some important research gaps as follow:

Firstly, although previous studies have explored the EVFTA's overall impact on bilateral trade and specific import and export activities between the EU and Vietnam - particularly for commodities like fruits, wood, textile, electronics - there is a lack of research focusing specifically

on pangasius exports despite Vietnam's significant dependence on this sector in the export structure.

Secondly, while most evaluations of the EVFTA's impact predominantly use the SMART model or qualitative analysis to assess policy effects on exports, this model tends to overlook regional economic impacts, and relying on assumptions from prior research. The gravity model, which offers a more detailed perspective, has generally been applied to broader trade assessments such as seafood, agriculture rather than specific sectors like pangasius.

Thirdly, existing studies often use a qualitative approach and focus on Vietnam's pangasius exports in a particular year. There is a scarcity of comprehensive analyses of pangasius exports over extended periods, such as from 2018 to 2023.

3.4. Research objectives

The primary goal of this research is to:

- Evaluate the impact of the EVFTA on Vietnam's pangasius exports to the EU in the period 2017-2023 using a gravity model approach. Specifically:
- Assess how the implementation of the EVFTA has impacted Vietnam's pangasius exports to the EU
- Determine significant factors influencing these export patterns
- Provide policy recommendations that can enhance Vietnam's pangasius exports strategy

3.5. Research hypothesis

This study examines the relationship between the exporting value of pangasius from Vietnam to importing Europe countries (ExValue) and six major socioeconomic factors: The Gross Domestic Product per capita (GDP_{pc}), population (Pop), geographical distance (Dist), trade openness (Open), exchange rate (ExRate), and EVFTA. Specifically:

- Hypothesis H_1: There is a positive correlation between Gross Domestic Product per capita (GDP_{pc}) and the exporting value of pangasius from Vietnam to importing Europe countries (ExValue).
- Hypothesis H_2: There is a positive correlation between population (Pop) and the exporting value of pangasius from Vietnam to importing Europe countries (ExValue).

- Hypothesis H_3: There is a negative correlation between geographical distance (Dist) and the exporting value of pangasius from Vietnam to importing Europe countries (ExValue).
- Hypothesis H_4: There is a positive correlation between trade openness (Open) and the exporting value of pangasius from Vietnam to importing Europe countries (ExValue).
- Hypothesis H_5: There is a positive correlation between exchange rate (ExRate) and the exporting value of pangasius from Vietnam to Europe countries (ExValue).
- Hypothesis H_6: There is a positive correlation between EVFTA (EVFTA) and the exporting value of pangasius from Vietnam to importing Europe countries (ExValue).

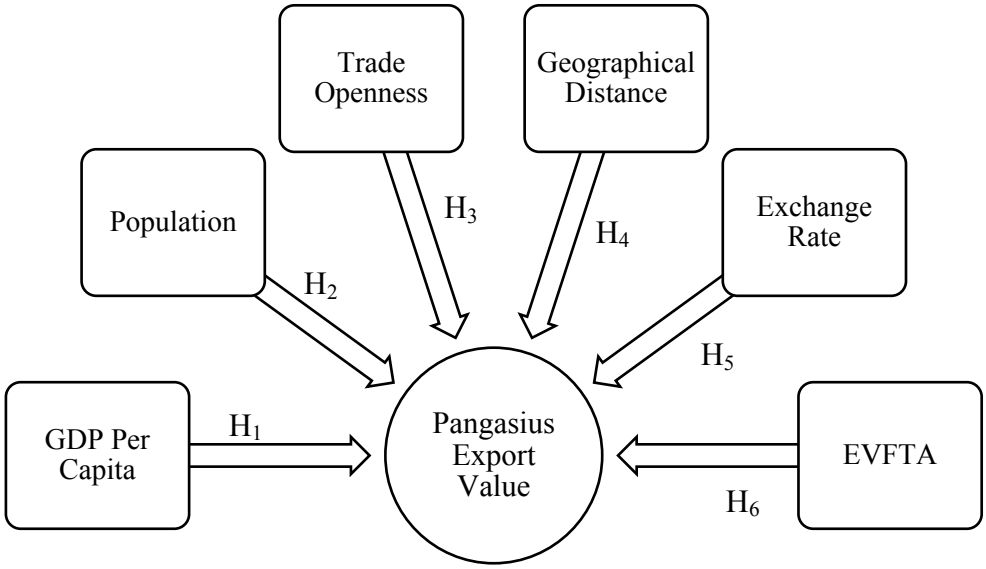

Figure 4: Research model proposed with hypotheses

Source: Authors compiled

4. Research methodology

4.1. Data collection

This study collected secondary data on 22 major EU countries that import pangasius from Vietnam, including Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. The data was gathered from credible sources such as Trademap and the World Bank, from 2018 to 2023, providing an up-to-date and comprehensive dataset for analysis. In the developed model, there are five independent variables and one dummy variable, resulting in a total of 130 observations across the selected countries and years. This robust

dataset supports the reliability of the analysis and ensures that the study captures both temporal and cross-country variations in pangasius imports.

4.2. Proposed model

4.2.1. Gravity model in international trade

The gravity model in international trade, first introduced by Jan Tinbergen (1962) who applied the concept of Newton's law of gravity to international trade, explains trade flows between two countries based on their economic size and distance. It follows the logic of Newton's law of gravity, where trade volume is directly proportional to the countries' GDPs and inversely proportional to the distance between them. This model has become a key tool for analyzing bilateral trade patterns. The basic formula is:

$$T_{ij} = G\frac{GDP_i GDP_j}{D_{ij}}$$

In which:

- T_{ij}: the amount of trade flows between country i and j
- G: a constant
- GDP_i and GDP_j: gross domestic products of country i and j
- D_{ij}: the distance between country i and j

After linearizing, the gravity model will take the following form, using logarithm function:

$$ln\left(T_{ij}\right) = \beta_0 + \beta_1 ln(GDP_i) + \beta_2 ln\ (GDP_j) + \beta_3 ln\ (D_{ij}) + \varepsilon$$

In which:

- β_0, β_1, β_2, β_3: coefficients to be estimated
- ε: unexplained variables that impact the trade between country i and j

4.2.2. Regression model

From the basic gravity model, we use it as a foundation for our expanded gravity model, with equations as follows:

$$ln\ (ExValue_{it}) = \beta_0 + \beta_1 ln(GDP_{pcit}) + \beta_2 ln\ (Pop_{it}) + \beta_3 ln\ (Open_{it}) + \beta_4 ln(Dist_i) + \beta_5 ln\left(ExRate_{it}\right) + \beta_6 EVFTA_{it} + \varepsilon$$

In which:

$\beta_0, \beta_1, \beta_2, \beta_3 \ldots$: coefficients to be estimated
$ExValue_{it}$: the exporting value of pangasius from Vietnam to country i in year t
GDP_{pcit}: the Gross Domestic Product per capita of the country i in year t
Pop_{it}: the population of country i in year t
$Open_{it}$: the percentage of trade to GDP of the country i in year t
$Dist_i$: the distance between Vietnam and country i
$ExRate_{it}$: the exchange rate between VND and country i in year t
$EVFTA_{it}$: whether country i in year t had EVFTA come into effect or not
ε: unexplained variables that impact the export value

4.3. Variables description

Table 2: Description of the model's variable

Variable	Description	Measurement	Source	Expected sign
	Dependent variable			
$ExValue_{it}$	The exporting value of pangasius from Vietnam to importing Europe country i in year t	Thousand USD	Trademap	
	Independent variables			
GDP_{pcit}	The Gross Domestic Product per capita of the importing Europe country i in year t	USD	Word Bank	+
Pop_{it}	The population of the importing Europe country i in year t	People	World Bank	+
$Open_{it}$	The percentage of trade to GDP of the importing Europe country i in year t	%	World Bank	+
$Dist_i$	The geographical distance between Vietnam and the importing Europe country i	Km	Distancefromto	-
$ExRate_{it}$	The exchange rate between VND and the importing Europe country i in year t	VND	World Bank	+

$EVFTA_{it}$	Whether the importing Europe country i in year t had EVFTA come into effect or not	Dummy variable = 1 in 2020, 2021, 2022, 2023; = 0 otherwise	Authors	+

Source: Authors compiled`

4.4. Regression analysis and conclusion

To analyze the data, several methods can be used, including Regression Pooled Ordinary Least Square (POLS), Fixed Effects Model (FEM), and Random Effects Model (REM). The authors estimate all three methods on STATA 18, then run the F-test and Hausman test to determine the most suitable model. The Variance Inflation Factor Test (VIF) is also employed for multi-collinearity. Afterwards, the model is tested for heteroskedasticity with Modified Wald test and autocorrelation with Wooldridge test. Finally, the authors use Feasible Generalized Least Squares (FGLS) to address remaining issues, ensuring the result accuracy.

4.4.1. Model testing

After running the OLS regressions, VIF test is used to test for the model's multi-collinearity. Below is the result:

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
      ln_pop |      2.28    0.437700
     ln_open |      1.98    0.504735
     ln_dist |      1.39    0.716958
    ln_gdppc |      1.20    0.834696
   ln_exrate |      1.08    0.926563
       EVFTA |      1.01    0.988468
-------------+----------------------
    Mean VIF |      1.49
```

Figure 5: Multi-collinearity test

Source: Authors calculated using Stata18

As can be seen from the picture, mean VIF = 1.49 < 10. The authors conclude there is no evidence of multicollinearity in the model.

Next, the authors use F-test to see if POLS or FEM is better suited for our research. Below is the result:

```
F test that all u_i=0: F(21, 103) = 40.19                     Prob > F = 0.0000
```

Figure 6: F-test result

Source: Authors calculated using Stata18

The p-value is 0.0000, we reject the null hypothesis. FEM is, therefore, more suitable than POLS.

Next, Hausman test for FEM and REM is used to determine which model is better for the research data.

	Coefficients (b) fe	(B) re	(b−B) Difference	sqrt(diag(V_b−V_B)) Std. err.
ln_gdppc	4.10214	.3722013	3.729939	1.19264
ln_pop	10.04285	1.285374	8.757475	4.093195
ln_open	.639292	1.797896	-1.158604	.5367247
ln_exrate	.4277281	.0939017	.3338263	.2025515
EVFTA	-.3440716	-.2034736	-.140598	.0326207

b = Consistent under H0 and Ha; obtained from **xtreg.**
B = Inconsistent under Ha, efficient under H0; obtained from **xtreg.**

Test of H0: Difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **24.41**
Prob > chi2 = **0.0002**

Figure 7: Hausman test result

Source: Authors calculated using Stata18

Since Prob > chi2 = 0.0002 < 0.05, we reject the null hypothesis. This means that REM is not appropriate, and therefore FEM should be used.

Having determined that FEM is employed, the authors run Modified Wald test to check for heteroskedasticity in fixed regression model.

H0: sigma(i)^2 = sigma^2 for all i

chi2 (22) = **1236.16**
Prob > chi2 = **0.0000**

Figure 8: Modified Wald test result

Source: Authors calculated using Stata18

The p-value is 0.000 < 0.05, the authors conclude that heteroskedasticity exists in the data. Next, the data is tested for autocorrelation. Using the xtserial command, the authors employ Wooldridge test to achieve the following result:

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      21) =     12.150
           Prob > F =      0.0022
```

Figure 9: Wooldridge test result

Source: Authors calculated using Stata18

Since p-value is 0.0022 < 0.05, there is autocorrelation in the panel data.

4.4.2. Regression result

As the model has existing heteroskedasticity and autocorrelation, the authors employ FGLS method to address these defects, and obtain the final regression result:

```
Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.7169)

Estimated covariances      =        22          Number of obs     =        130
Estimated autocorrelations =         1          Number of groups  =         22
Estimated coefficients     =         7          Obs per group:
                                                              min =          4
                                                              avg =   5.909091
                                                              max =          6
                                                Wald chi2(6)      =     138.19
                                                Prob > chi2       =     0.0000
```

ln_exvalue	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
ln_gdppc	-.2618376	.2159539	-1.21	0.225	-.6850995	.1614243
ln_pop	1.030356	.1120775	9.19	0.000	.8106886	1.250024
ln_open	1.92119	.3359897	5.72	0.000	1.262662	2.579718
ln_dist	2.771612	1.161321	2.39	0.017	.4954645	5.04776
ln_exrate	-.1843183	.1152395	-1.60	0.110	-.4101836	.041547
EVFTA	-.3387997	.0942701	-3.59	0.000	-.5235657	-.1540337
_cons	-37.64665	10.66897	-3.53	0.000	-58.55744	-16.73585

Figure 10: Regression result

Source: Authors calculated using Stata18

The model fit is evaluated using the Wald chi-square test. The Wald chi2(6) statistic is 138.19, with a corresponding p-value of 0.0000. This result indicates that the independent variables jointly have a statistically significant impact on the dependent variable, export value. Consequently, the null hypothesis that all coefficients are equal to zero is rejected, confirming the overall significance of the model.

EVFTA: has a negative and statistically significant effects on exports, ($\beta = -0.3387997$, $p = 0.000$), contrary to our prediction. There are several reasons for this. First, the EVFTA's period of effect is not long enough to observe a significant change in export data as it only took effect in 2020. Second, EVFTA's strict non-tariff measures are a major challenge for Vietnam exporters. Many businesses struggle with ROO, finding it complicated and difficult to navigate, which leads to reluctance in engaging with it. Even when businesses recognize the benefits, they face difficulties obtaining C/O due to the lack of self-certification options, the cumbersome electronic

C/O process, and time-consuming manual procedures. Additionally, SPS measures also present substantial challenges, particularly with respect to residual antibiotic levels in exports. According to Tepbac (2022), exporters often overuse antibiotics as a fast solution to diseases in farming, leading to several cases export batches of pangasius from Vietnam being returned. Moreover, obtaining SPS quality certifications, such as HACCP or Global GAP, from independent organizations incurs significant costs, further complicating the process for exporters. Regarding TBT, the increasingly stringent labeling and packaging regulations, particularly those focusing on eco-friendly packaging, pose another challenge. The concept of eco-friendly labelling is still new for Vietnamese exporters, coupled with the EU continuing to raise sustainability expectations further hinders Vietnamese businesses to catch up with these requirements. Consequently, many businesses struggle to effectively capitalize on the tariff preferences offered by EVFTA. Third, Vietnam's exporters EVFTA utilization rate is still low. According to a survey by the VCCI research group, only 17.2% of Vietnamese exporting enterprises have benefited from EVFTA's tariff preferences with at least one exported shipment in 2022, and the figure increased to 26% in 2023. This is because GSP tariff for pangasius is already low prior, at 5.5% and 8%, thus businesses do not benefit much from EVFTA. Another less common but concerning reason is that businesses are unaware of the EVFTA tariff benefits (15.4% of businesses). Notably, while only 10,8% of FDI businesses cited this reason, 20.4% of domestic businesses mentioned it from VCCI survey as they fail to actively research about EVFTA tariff reduction. Fourth, the global economic climate between 2018 and 2023 is also a factor for the negative correlation. Global crises like Covid-19 pandemic acutely disrupted the logistic chains, inducing problems such as port congestion and delayed custom clearance. The 2023 global inflation kept demands for new orders low and inventory levels of pangasius high, while simultaneously reducing the buying powers of EU nations.

GDP per capita: is not statistically significant ($\beta = -0.2618376$, $p = 0.225$). The result suggests that higher income levels might slightly reduce exports, possibly due to a shift to more expensive products that comes with income raised while pangasius, an affordable option, becomes less attractive.

Population: has a positive and significant effect on exports, ($\beta = 1.030356$, $p = 0.000$). This suggests that countries with larger populations tend to have higher import values, likely due to an increased demand for goods, especially pangasius from Vietnam.

Trade openness: has a positive and highly significant effect on exports, ($\beta = 1.92119$, $p = 0.000$) indicates that greater openness to trade policies, like reducing tariffs and enhancing trade agreements, significantly boosts export values.

Distance: has a positive and significant effect on exports, ($\beta = 2.771612$, $p = 0.017$). This result contradicts our predictions, as greater distance is typically expected to increase trade costs and reduce exports. An explanation is that Vietnam's biggest markets for pangasius export are Netherlands, Germany, and Belgium. Although located relatively far from Vietnam, their demands for pangasius are higher compared to other EU nations. Moreover, this can also be attributed to their geographical advantages. Netherlands' port of Rotterdam is the largest port in the EU, controlling more than 30% of goods delivered to the EU by sea as of 2022. Belgium's Zeebrugge and Germany's Hamburg port are also recognized by Vietnam Association of Seafood Exporters and Producers as one of the key ports of pangasius export and re-distribution into the EU. In other words, despite located farther from Vietnam, their high demands and geographical advantage compensate for the long distance.

Exchange rate: is not statistically significant ($\beta = -0.1843183$, $p = 0.110$). This indicates that an increase in exchange rate is associated with a decline in export value. While conventional economic theory suggests that a weaker currency should make exports more competitive, the results suggest that other factors, such as exchange rate increasing due to inflations and global pandemic can distort trade flow.

4.4.3. Conclusion

In summary, the model reveals that while population size, distance, and trade openness boost Vietnam's pangasius export to the EU considerably, a greater exchange rate and EVFTA hinders pangasius trade.

5. Recommendation

The findings of this study provide valuable insights into the impact of the EU-Vietnam Free Trade Agreement (EVFTA) on Vietnam's pangasius exports to the EU. To enhance export performance and maximize the benefits of this trade agreement, coordinated efforts from both the government and enterprises are essential.

For enterprises, their active effort to adhere to the EU's stringent non-tariff measures are essential. First, regarding Sanitary and Phytosanitary Measures (SPS) challenges, improving the

quality of pangasius products is key. One recommended solution is to adopt an animal-cruelty-free approach to farming and ensure a high-quality raising environment, aiming for better growth and sustainability alike. Additionally, developing disease-resistant breeds will help reduce antibiotic use and maintain high industry standards. Ensuring compliance with the Technical Barriers to Trade (TBT) regulations is also essential. Staying updated on regulatory changes, obtaining certifications like ASC and Global G.A.P, and adjusting labeling will help meet market requirements. As for overcoming Rule of Origin (ROO) barriers, Vietnam enterprises should invest in internal training for staff of specialized departments and consult from other entities to enhance understanding of origin certification requirements. Furthermore, implementation of digital traceability systems, such as blockchain and QR codes, is highly recommended to improve transparency in tracking origin and streamline verification processes. Post 2023 inflation, businesses must also optimize operations to maintain competitve prices.

Besides the efforts of businesses, the cooperation and assistance of the government is of great importance. One crucial step the government can take is to simplify and modernize the process of issuing Certificates of Origin (C/O), thereby enhancing trade efficiency and reducing administrative burdens for exporters. Concurrently, ensuring the sanitary and epidemiological quality of pangasius products is important. Stricter management and monitoring domestic products will uphold safety standards, strengthening consumer trust in EU markets. Additionally, the government can provide aids for enterprises to keep them afloat during economic turmoil by practices like providing preferential credit and financial support, developing aquaculture value chain, and giving technical and technological support. Beyond quality control, innovation in national standards, legal frameworks, and branding will help reinforce the industry's position and image in EU markets. Enhancing trademarks and production area codes will also provide stronger market recognition and adaptation to global trade trends.

In conclusion, while the EVFTA presents significant opportunities for Vietnam’s pangasius exports, overcoming non-tariff barriers, regulatory challenges, and market competition is essential for long-term success. Collaboration between the government and businesses is crucial to enhance policies, operations, and competitiveness for sustainable growth in the sector.

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