

AN EMPIRICAL STUDY OF THE TECHNICAL TRADE BARRIERS AND FREE TRADE AGREEMENTS ON VIETNAM'S APPAREL EXPORT VALUE AND EXPORT EFFICIENCY

NGHIÊN CỨU THỰC NGHIỆM SỰ ẢNH HƯỞNG CỦA CÁC RÀO CẢN KỸ THUẬT
TRONG THƯƠNG MẠI VÀ CÁC HIỆP ĐỊNH THƯƠNG MẠI TỰ DO
ĐẾN GIÁ TRỊ XUẤT KHẨU VÀ HIỆU SUẤT XUẤT KHẨU HÀNG MAY MẶC
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*Dang Thi My Hanh, Le Thi Bao Trinh, Ho Thanh Bao, Huynh Hieu Ngan,
Phung Nam Phuong, Bui Huynh Nguyen*

ABSTRACT

The study, firstly, aims to indicate factors affecting the export value and export efficiency of Vietnam's apparels with Pool Regression, Fix Effect Model and Random Effect Model. In order to capture the effects of factors on export value, Gravity model of Tinbergen (1962) is applied. The results reveal that the gross domestic product of importing countries, Vietnam's population and real exchange rate have a positive impact on Vietnam's apparel export whereas importers' population and geographical distance have the opposite effect. The export efficiency (TRE), which is estimated based on Battese and Coelli (1992) method, is indicated to be much lower than the potential. The study continues to examine the effect of technical barriers to trade (TBT) and the engagement into Free Trade Areas (FTA) around the world of Vietnam to the TRE coefficient, the result shows that both factors can impede and promote the coefficient.

Keywords: Export value, Export efficiency, Technical Barriers to Trade, Vietnam's apparel products.

TÓM TẮT

Nghiên cứu chỉ ra các yếu tố ảnh hưởng đến giá trị và hiệu suất xuất khẩu hàng may mặc của Việt Nam kết hợp với phương pháp Pool Regression, Fix Effect Model và Random Effect Model. Thông qua mô hình Trọng lực của Tinbergen (1962), tổng sản phẩm quốc dân của nước nhập khẩu, dân số Việt Nam và tỷ giá hối đoái thực thúc đẩy giá trị xuất khẩu hàng may mặc trong khi dân số nước nhập khẩu và khoảng cách địa lý có tác động ngược lại. Hiệu suất xuất khẩu (TRE), được ước tính dựa trên phương pháp Battese và Coelli (1992), thấp hơn nhiều so với tiềm năng. Nghiên cứu tiếp tục xem xét sự ảnh hưởng của các rào cản kỹ thuật trong thương mại (TBT) và việc tham gia các Khu vực Thương mại Tự do (FTA) của Việt Nam đến hệ số TRE, kết quả cho thấy cả hai yếu tố này đều có thể cản trở và thúc đẩy hệ số trên.

Từ khóa: Giá trị xuất khẩu, Hàng may mặc Việt Nam, Hiệu suất xuất khẩu, Rào cản Kỹ thuật trong Thương mại.

1. Introduction

Apparel, one of the most important sectors of the textile industry, is a simple labor-intensive stage, and usually takes advantage in countries with abundant labor resources and cheap labor costs (Khai et al., 2013). Therefore, textile and apparel production often develops strongly and has

great efficiency in developing countries which are in the early stages of industrialization, including Vietnam

Dang Thi My Hanh, Le Thi Bao Trinh, Ho Thanh Bao, Huynh Hieu Ngan, Phung Nam Phuong, Bui Huynh Nguyen, University of Economics – The University of Da Nang

(Deegahawathura, 2018). In contrast, for industrialized countries with high technology levels, high labor costs, which means low level of competitiveness in textile production. As a result, these countries tend to reach for industries with higher technical content, less labor and greater profitability. In other words, the textile and garment industry, especially the apparel industry, can promote its role in developing countries and have suitable conditions, including Vietnam, based on its comparative advantages in human resources and labor costs.

According to Mr. Vu Duc Giang, chairman of the Vietnam Textile and Apparel Association, the industry's export target will reach \$55 billion by 2025. Trade surplus strives to reach 33 billion USD, average growth of 11.6% and ensure 3 million employees. To achieve this vision, Mr. Giang highlighted that Vietnam should make better use of opportunities from Free Trade Agreements (FTA). In fact, increasing participation in FTAs has brought opportunities to enjoy preferential tax rates and reduce barriers when exporting to FTA partner markets (WTO Center and Integration; Vietnam Chamber of Commerce and Industry, 2019). However, while tariff regulations are being phased out, Vietnam's exports are still being increasingly affected by non-tariff barriers (NTMs) such as rules of origin, technical barriers, anti-subsidy, anti-dumping, self-defense, etc. (Nguyen Bich Thuy, 2020).

Vietnam's exports are affected by 44,408 NTMs, accounting for 72% of the world's total number. Out of the total number of NTMs in Vietnam, 54% are TBT measures (Huong et al., 2021). In particular, TBT, which is defined by the World Trade Organization (WTO) as the technical standards and regulations that a country applies to an imported product, and the

process of evaluating that imported product based on the standards. Compliance with these measures sometimes requires significant changes not only to the finished product, but also to the process, growth, source of raw materials, packaging, transportations and so on. This poses difficulties for exporting countries, including Vietnam, because if the technical requirements are not met, the non-conforming goods might be refused to be imported. (Vietnam Chamber of Commerce and Industry). TBT is likely to be viewed as both a "fence" for exports and a "scale" for a country's export capability. This "scale" will be a system of criteria that allows exporting countries to assess to what extent their export responsiveness is (Ghodsi, 2019). In this research, TBT is quantified by using TBT Coverage ratio (share the value of commodity affected by at least one TBT measure) and TBT Frequency ratio (the percentage of goods subjected to one or more NTMs) (WITS).

Classical and new trade theories, though, may explain the motivations in which nations engage in world trade; however, the scale of trade flows cannot be analyzed (Do, 2006). On the other hand, the Gravity model can be widely used to analyze characteristics and performance as well as estimate the size of trade in international trade (Do, 2006). The Gravity model explaining bilateral trade is based on explanatory variables: the size of the two partner economies and the distance between them, first studied in 1962 (Nello & Susan, 2009). In addition, this model is used to assess the impact of free trade agreements (FTAs) on trade flows, explaining bilateral import demand with a range of different variables such as income of the importing country and exporting country, the per capita income of the two countries, the geographical distance between the two

countries and other variables (Nguyen Van Tuan & Tran Thi Huong Tra, 2017). By examining the relationship of countries with “economies of scale” and the underlying assumption that countries compete exclusively in different goods (Anderson, 1979), the Gravity model is found to be very suitable for pointing out the factors affecting Vietnam's apparel exports in the period of 2010-2019.

In terms of trade value, the academic community has extensively applied the Gravity model to measure the impact of trade flows between countries as well as evaluate their export potential, for instance, the research of Armstrong et al. (2008), Kang (2014), Doan & Xing (2017), Nguyen (2013), Kraja & Sejdini (2014), etc. Besides, much is known about studies of specific products such as rice, wood, coffee of Natale et al. (2015), Dlamini et al. (2016), Abafita et al. (2021), etc. However, the majority of these products are agricultural products, which are associated with natural factors of production whereas the apparel industry is a labour-intensive field. In other words, applying the prior models to apparel products is infeasible. Besides, little research based on the Gravity model has been conducted to exploit the development of the apparel industry in Vietnam, which means there should be an appropriate examination in terms of the apparel industry.

Regarding trade efficiency, the majority of prior studies focused on estimating trade efficiency regarding total export or export to a specific market, for example in the research of Doan & Xing (2017), namely “Trade efficiency, Free Trade Agreements and Rules of Origin” or Hai et al. (2017) in estimating trade efficiency between Vietnam and ASEAN markets. In this regard, trade efficiency is understood as the ratio of the actual export volume to the maximum

potential export volume that Vietnam is able to achieve (Doan & Xing, 2017). Besides, these investigations, carried out by Doan & Xing (2017), Hai et al., (2017), Drysdale et al. (2012) etc., have only clarified the relationship between the coefficient, free trade areas engagements, tariffs and non-tariffs barriers, i.e. rules of origin. Therefore, they failed to identify the trade efficiency of apparel exports and capture the effect of TBT on TRE.

In terms of TBT's influences on export value, TBT was attributed negatively to the trade value of Vietnam's tea exports to the world market (Nguyen et al., 2021) due to the increasing in production costs, including fixed cost and variable cost. The increased costs make Vietnam's tea export less profitable, resulting in decreases in export volumes. However, Bhyuana et al. (2020) indicated the positive relationship between the value of TBT coverage, TBT frequency ratios and Textiles & Garments product exports from Bangladesh to the USA market. The results pointed out that although compliance with technical standards could raise costs, Bangladesh had succeeded in exploiting economies of scale, taking a large amount of customers' information and achieving competitiveness advantages in the importing markets. In other words, thanks to TBT, the benefits will outweigh the costs in the long run. The similar conclusion has also been clarified by Wood et al. (2017). There are some arguments show that an increase in TBT could hinder the probability of getting access to importing markets, which then restrict the trade value. However, the authors suggested that the impact of TBT, in fact, varied between kinds of products and that is the reason why the research re-examines TBT measures in terms of apparel products. On the other hand, the study aims to clarify the relationship between TRE and TBT

measures without considering the link between TRE and apparel export value. This is because TBT regulations in this research are illustrated in the perspective of a country's government policy. Besides, based on Battese & Coelli (1992) method, there is a positive correlation between TRE and export value. To put it another way, this modification has the potential to assure consistency in results. Additionally, capturing the effects of TBT on TRE ensures that the nature of the Gravity model is preserved.

In summary, by using the Gravity model of Tinbergen (1962) and stochastic gravity model associated with Battese and Coelli (1992) method, the research determines (1) factors affecting Vietnam apparel export value (2) the export efficiency over the period and (3) and the relationship between engagement in free trade agreements and non-tariff barriers, in particular TBT and TRE. Finally, based on the results and the current situation of apparel exports (HS 61) of Vietnam from 2010 to 2019, several recommendations will be proposed to promote Vietnam's apparel exports in the future.

2. Theoretical framework and methodology

2.1. Theoretical framework

2.1.1. The Gravity model

The Gravity model was initiated by Tinbergen (1962) and Poyhonen (1963) and widely applied in empirical studies to quantify the trade effects of economic bloc linkages. Due to the efficiency and ease in determining the factors that affect exports as well as the level of their impact on exports, including the consideration of the supply side, the demand side and factors that hinder or attract exports, the gravity model then

continues to be developed and applied in a lot of studies of Anderson (1979), Bergstrand (1990), Wincoop (2003) and Helpman et al. (2006). While theoretical models can only consider supply-side or demand-side factors (such as GDP/GNP, population, infrastructure, import tariffs, FDI, labor costs, coastal location, etc.) and can only be effective for export research in the medium and long term or in the short term, Gravity models can solve this problem by studying both sides of trade. In this model, it can be concluded that exports are positively affected by the economies scale of countries and distance is expected to negatively affect trade flows. The gravity model studying trade between two countries takes the following form:

$$X_{ij} = \alpha GDP_i^{\beta_1} GDP_j^{\beta_2} POP_i^{\beta_3} POP_j^{\beta_4} DIST^{\beta_5}$$

Where X_{ij} is the export value of country i to country j , GDP_i is gross domestic product of country i and country j , POP_{ij} is the population of country i and country j , $DIST$ is the distance between country i and country j , α is coefficient of attraction or hindrance. In terms of factors affecting Viet Nam's apparel exports, proposed model can be written as follows:

$$\begin{aligned} \ln(X_{ij,t}) = & \beta_1 + \beta_2 \ln(GDP_{i,t}) + \\ & \beta_3 \ln(GDP_{j,t}) + \beta_4 \ln(POP_{i,t}) + \\ & \beta_5 \ln(POP_{j,t}) + \beta_6 \ln(DIST_{ij}) + \\ & \beta_7 \ln(RER_{VND/CUR,t}) + \beta_8 FTA_{ij,t} + \mu_{ij,t} \end{aligned}$$

Where $X_{ij,t}$ is Vietnam's apparel export value to country j in year t ; $GDP_{j,t}$ and $GDP_{i,t}$ are GDP of country j and Vietnam in year t ; $POP_{j,t}$ and $POP_{i,t}$ are the population of country j and Vietnam in year t ; $DIST_{ij}$ is the geographic distance between Hanoi (Vietnam's capital) and the capital of country j ; $FTA_{ij,t}$ - dummy variable, is free trade

agreement between Vietnam and country j , which takes into effect in year t .

2.1.2. The Stochastic Frontier Gravity model and export efficiency

The Stochastic Frontier Gravity (SFG) model is used for the purpose of measuring production efficiency and capturing trade resistances in addition to the obvious resistances usually measured in economic gravity models. The model was developed by Aigner et al. (1977) and Meeusen & Broeck (1977). The SFG applied in the Gravity Model is considered an appropriate way to handle and estimate unobservable resistance levels which are also called as non-tariff barriers to trade (Armstrong, 2007). Kalirajan & Findlay (2005) proposed a method of estimating export efficiency with the gravity model promoted by studies and workshops on measuring production possibility limits. Export efficiency is defined as the highest achievable export value without artificial barriers (Armstrong, 2007). According to this study, the form of the random boundary gravity equation is given as follows:

$$X_{it} = f(Y_{it}; \beta) \exp(v_{it} - u_{it})$$

Where X_{it} is the export value of Vietnam to partner country i in year t and $f(Y_{it}; \beta)$ is Vietnam's maximum potential trade with only natural barriers; v_{it} is statistical error due to random factors and assumed to be normally distributed and independent of u_{it} ; u_{it} is the technical inefficiency part, or technical inefficiency, which is assumed to be greater than or equal to zero (non-negative) and has a semi-normal distribution. If Vietnam's apparel exports lie on the frontier, thus, the maximum export level is reached based on available factors. If apparel exports are below the marginal export line, which means the actual export value (X_{it}) is less than the maximum export value (X^*)

and the difference between X^* and X_{ij} is technical inefficiencies (Battese & Coelli, 1992). Efficiency measures from the SFG method range from 0 to 1: a value of 1 indicates 100% efficiency and a value of 0 indicates 0% efficiency.

$$TRE = \frac{\exp[\ln(X_{ij,t})]}{\exp[\ln f(Y_{it}; \beta) + \varepsilon_{it}]}$$

Where $\exp[\ln(X_{ij,t})]$ is the actual export values in year t and $\exp[\ln f(Y_{it}; \beta) + \varepsilon_{it}]$ is the possible maximum export values in Vietnam. When capturing the effects of factors on export efficiency, two types of policies are demonstrated including those imposed by the government of a country and those agreed by governments among countries. As for the policy imposed by the government in a country, freedom of trade (FT) is taken into consider. In regard to the policies negotiated between governments of nations, Free trade areas (FTAs) such as ASEAN, NAFTA, and EU will be examined. Free trade area is a group of countries that apply little or no trade barriers regarding tariffs or non-tariffs toward country members in the region (Rasure, 2020). On the other hand, another non-tariff barrier - technical barrier to trade (TBT) will be captured in the model. TBTs are defined as standard barriers or import regulations that reflect a country's concerns and judgments toward its safety, health, product quality, and environment (Hillman, 1991; Roberts & DeRemer, 1997). Adaptation of quality, labeling and technical standards, however, raises costs and reduces competitive advantages (Fontagne & Orefice, 2018). Besides, TBT can promote the trade of existing exporters while impeding potential competitors from entering the market or by driving marginal exporters out of the market (Bao & Chen, 2013). The model of factors affecting export efficiency can be written as follows:

$$TRE_{jt} = \alpha_0 + \alpha_1 TBT_j + \alpha_2 ASEAN_j + \alpha_3 EU_j + \alpha_4 NAFTA_j + \alpha_5 FT_{jt} + \varepsilon_{jt}$$

Where TRE is export efficiency of Vietnam's apparel exports, TBT coverage ratio is defined as the total value of imports which are subjected to TBT. TBT Frequency ratio represents the presence or absence of a measure, expressing the percentage of goods subjected to one or more NTMs. Regions (ASEAN, EU, NAFTA) are dummy variables equal to 1 if country j is the region's member and otherwise have the value of 0. FT_{jt} is the Trade freedom index of country j in year t.

2.2. Methodology

2.2.1. Sampling method and data collection

Data are collected and presented as panel data, through which data can be compared between two dimensions of space and time. Data will be collected in 35 countries who are the biggest HS61 importers over 10 years for the period of 2010-2019 ($n=35 \times 10=350$). The study uses a purposeful sampling method, because, based on information from the International Trade Center (ITC), The export value into these 35 countries contributed to more than 98.6% of Vietnam's total apparel export price of HS 61 code in the period of 2019. Thus, with the above significant weight, using the data of these 35 countries for the study is expected to bring positive results as well as contribute to the export performance of apparel products with HS code 61 of Vietnam.

The data used for the variables in the study are synthesized and calculated from reputable data sources, verified by world organizations, including: The World Trade Center (ITC), World Bank (WB), Center for International Prospects and Information Research (CEPII), Vietnam Chamber of Commerce and Industry (VCCI), The

Heritage Foundation and International Monetary Fund (IMF).

2.2.2. Data processing method

Gravity-model-based evaluation of previous studies relied on the application of OLS regression in panel data tables. However, several studies have proven that the OLS regression model gave biased results because it ignored heterogeneous factors such as language, culture, and history. Matyas (1997) proposed a gravity model approach based on a "3-dimensional model" - between the importing country, the exporting country and the effects of time (fixed or random). In other words, it is necessary to use panel data so that we can control the effects of random and fixed factors, and remove endogenous phenomena from heterogeneous and unobserved variables (Muhammad et al., 2020). Correspondingly, Plumper & Troeger (2007) suggested that while the fixed effect model could not capture the effect of time invariants, OLS regression, random effect, model was considered to better determine time invariants' influence. That is to say, besides the OLS regression method, random effects model (REM) will be applied to determine the influence of geographical distance factor on Vietnam's apparel exports in the period 2010-2019. And Hausman results will indicate the selection of appropriate explanatory model (Muhammad et al., 2020). All stages of the data process are based on the STATA program.

Moreover, based on the model of Battese & Coelli (1992) TRE is defined as the ratio between actual and potential exports. The higher this coefficient, the closer the export volume to the export border (with a value of 1) (Thang & Xing, 2017). After estimating the TRE coefficient over the years, the relationship between TRE, TBT and

engagement in free trade areas is tested using a baseline model - OLS regression.

3. Results

3.1. Factors affecting Vietnam's apparel exports

Table 3.1

Factors affecting Vietnam's apparel exports

Variables	OLS	FEM	REM
lnGDP	1.812*** (0.000)	1.772*** (0.000)	1.723*** (0.000)
lnGDPVN	-0.309 (0.814)	-0.321 (0.624)	-0.357 (0.583)
lnPOP	- 0.898*** (0.000)	-5.927*** (0.000)	-0.855*** (0.000)
lnPOPVN	15.931 (0.145)	20.584*** (0.000)	16.968*** (0.002)
lnDIST	- 0.403*** (0.000)		-0.390* (0.062)
lnRER	0.110*** (0.001)	0.096 (0.407)	0.096 (0.162)
FTA	0.050** (0.016)	0.035** (0.013)	0.030** (0.028)
Constant	- 296.537* (0.076)	- 295.730*** (0.000)	- 312.787*** (0.000)
Observations	350	350	350
R-squared	0.749	0.615	
Adjusted R-squared	0.744	0.565	
Number of Importer	35	35	35

Note: ***, **, * shows that the null hypotheses are rejected at 1%, 5% and 10% level of significance

Source: The authors' calculation

Table 3.2

Results of Hausman test

Chisq	10.45
P value	0.1070>0.05

Table 3.2 shows the results of Hausman test with p-value = 0.1070 > 0.05, accepting hypothesis Ho. In other words, the random effects model (REM) gives better results than the fixed effects model (FEM). However, time invariants such as geographical distance cannot be estimated through the FEM model (Oscar, 2013).

Table 3.1 shows the effect of variables on Vietnam's apparel exports. Based on the results of the OLS regression model, the GDP of the partner country is considered to have a positive correlation with Vietnam's apparel export value. Specifically, an increase of 1% of the GDP of the partner country makes the export value of Vietnam's apparel jump by 1.812% in the period 2010-2019. Similarly, the fixed effects model (FEM) and random effects gravity model (REM) indicated the positive correlation between GDP of the partner country and Vietnam's apparel exports. Specifically, the export value of Vietnamese apparels with HS code 61 increased by 1.772% and 1.723% respectively when partner country's GDP increased by 1% with a significance level of 1%. However, at the 1% level of significance, the value of apparel exports (HS 61) decreases by 0.898%, 5.927% and 0.855% when the population of the partner country increases by 1% accordingly towards OLS, FEM, FEM.

In addition, it can be seen that there is an inverse relationship between geographical distance and Vietnam's apparel export value (HS61). To be specific, in OLS regression, a 1% increase in geographical distance reduces export value by 0.403% at 1% significance

level. Regarding Vietnam population variable, it can be concluded that Vietnamese apparel exports is promoted by Vietnam population, with the coefficient of 20.584 and 16.968 at a significance level of 1% in FEM and REM respectively.

The real exchange rate factor promotes Vietnam's apparel exports with the coefficient of 0.110 at the significant level of 1%. In this regard, an increase in real exchange rate means that Vietnam apparel exports become much cheaper compared to domestic goods of importing countries, which, therefore, facilitates Vietnam apparel exports. In terms of FTA, it can be concluded that the participation in free trade agreements

helps foster Vietnam apparel export value HS61 with coefficient ranging from 0.03 to 0.05 at the significant of 5%. In consequence, despite increasing engagement in FTAs it can be challenging for Vietnam to completely benefit from these agreements.

However, based on data from 35 markets to demonstrate the impacts of factors on Vietnam's apparel export value, regretfully, there is an insignificant relationship between Vietnam's GDP and apparel export value. This indication is similar to Nguyen et al. (2019) results in investigating trade efficiency of Vietnam in rice export activity, in which Vietnam's GDP effect could not be captured in the model.

3.2. Vietnam's apparel export efficiency

Table 3.3

Export efficiency regarding Asia Pacific countries

	Country	2010 - 2011	2012 - 2013	2014 - 2015	2016 - 2017	2018 - 2019
Other Asian Countries	China	2.45%	2.96%	3.54%	4.20%	4.95%
	Hong Kong	3.79%	4.48%	5.26%	6.11%	7.06%
	Russian	4.15%	4.88%	5.70%	6.60%	7.59%
	Japan	13.52%	14.98%	16.50%	18.10%	19.75%
	South Korea	16.56%	18.16%	19.81%	21.52%	23.28%
ASEAN	Malaysia	2.90%	3.47%	4.13%	4.86%	5.67%
	Philippines	4.52%	5.30%	6.16%	7.10%	8.13%
	Cambodia	7.86%	8.95%	10.13%	11.39%	12.73%
EU	Italy	3.30%	3.93%	4.64%	5.43%	6.31%
	France	3.42%	4.07%	4.80%	5.60%	6.50%
	Germany	4.53%	5.31%	6.17%	7.11%	8.15%
	United Kingdom	5.61%	6.51%	7.48%	8.55%	9.69%
	Spain	8.56%	9.71%	10.94%	12.25%	13.64%
	Belgium	10.04%	11.29%	12.63%	14.04%	15.52%
	Netherlands	13.47%	14.92%	16.45%	18.04%	19.69%
NAFTA	Mexico	9.45%	10.66%	11.96%	13.33%	14.78%
	Canada	15.06%	16.59%	18.19%	19.85%	21.56%
	USA	62.67%	64.16%	65.60%	67.01%	68.37%
	Chile	15.76%	17.32%	18.94%	20.62%	22.36%

Source: The authors' calculation

Table 3.3 reports the estimated trade efficiency of Asia Pacific countries, including three countries in ASEAN and some countries such as China, Hong Kong, Russian Federation, Japan, Chile and Republic of Korea. In general, empirical results show that Vietnam's export efficiency with trading partners increased slightly, ranging from 3% to 5% between 2010 and 2019. For some countries in APAC, including China, Hong Kong, Russian Federation, Japan, Chile and the Republic of Korea, Vietnam's export efficiency to the Republic of Korea reached the highest, about 23.28%, accounting for just over 1/5 than the maximum potential. It is followed by Chile, with an export performance of 22.36% of the maximum volume in 2019. Russian Federation exports account for almost 8% of the export efficiency. For export efficiency in the China market, in the period 2018-2019, this value has not reached 8% of the maximum value. It is difficult for Vietnam to increase the value of exports to the Chinese market to achieve its maximum capacity (Nguyen & Yuqing, 2017).

Among the seven EU member countries, the export efficiency of Vietnam with Italy, France, Germany, United Kingdom, Spain, Belgium and the Netherlands has grown steadily, ranging from 2% to 5% over the period 2010-2019. The United Kingdom is the largest import market for apparel with HS 61 code, the export efficiency of this group of goods to the United Kingdom is at a very low level, 5.61% and 9.69% respectively in 2010 and 2019, about 1/10 compared to what Vietnam could achieve. The efficiency of Vietnam's exports to NAFTA countries increased more than ASEAN member countries, increasing by an average of 6% - 8% after 10 years. Although up to this point, the USA and Vietnam still have no free trade agreement, the HS61 apparel export

efficiency of Vietnam is the highest with 68.37%. Similarly, actual exports to Chile accounted for 22.36% of the maximum, which is greater than any other countries regarding Vietnam's export efficiency.

3.3. Factors affecting export efficiency in the period 2010-2019

Table 3.4

Factors affecting export efficiency in the period 2010-2019

Variable	OLS
NAFTA	0.289*** (0.000)
EU	-0.051*** (0.000)
ASEAN	0.017 (0.209)
TBT Coverage ratio	-0.106*** (0.003)
TBT Frequency ratio	0.220*** (0.000)
FT	0.003*** (0.000)
Constant	-0.234*** (0.000)
Observations	320
R-squared	0.554
Adjusted R-squared	0.545
Number of Importer	32

*Note: ***, **, * shows that the null hypotheses are rejected at 1%, 5% and 10% level of significant*

Source: The authors' calculation

Table 3.4 indicates the positive impact of not joining NAFTA on Vietnam's apparel export efficiency. Despite not being a NAFTA member, Vietnam's apparel can take

advantage from these countries, with the coefficient of 0.289 at a significant level of 1%. In fact, the USA is one of the biggest importing markets of Vietnam's apparel, with high demand and purchasing power and Vietnam's apparel up to now has a significant belief on American customers. At a significant level of 1%, non-accession to the EU is considered to be a hindrance to Vietnam's apparel export efficiency. In other words, not being an EU member can negatively affect this coefficient. There is a negative correlation between the TBT coverage rate and the export efficiency. Specifically, a 1% increase in TBT coverage can reduce the TRE by 0.106% at the 1% level of statistical significance. Meanwhile, the TBT Frequency ratio has a positive effect on the TRE with the coefficient at 0.220. This result can be explained by the argument of Bhyuana et al. (2020) when supposed compliance with technical standards facilitates exploiting economies of scale and taking a large amount of customers' information and achieving competitiveness advantages in the importing markets. Besides, economic freedom is a contributor to the increase of the TRE. At 1% significance level, the TRE coefficient increases by 0.003% when the free trade index increases by 1%. However, in actual fact, there were not significant changes in this index among countries, which to some extent can explain why its impact on TRE is not remarkable.

In summary, during the period 2010-2019, Vietnam's apparel export value was still very low compared to the potential level with the US being considered as the partner country with the highest export efficiency. Besides, regarding the correlation between TBT, FTA and TRE, if the TBT coverage factor limits the TRE, the frequency coefficient gives the opposite effect. To be

specific, it can be indicated that compliance with non-tariff barriers, especially technical standards, has limited the export value of Vietnam's apparels. Meanwhile, excluding NAFTA, not participation in free trade areas can bring a negative contribution to this coefficient

4. Conclusion

The research has explored a model consisting of several factors affecting Vietnam apparel export value. To be specific, the gross national product of the partner country and the population of Vietnam have a significant positive influence on the value of Vietnam's apparel exports, while the partner country's population and geographical distance limit the growth of this value. In addition, the paper can cover insignificantly positive impacts of real exchange rate and free trade agreements on the export value.

Regarding export efficiency estimation, Vietnam's apparel export efficiency in the period of 2010-2019 is much lower compared to the actual potential, with the US-VN efficiency ranked first. The results reveal that non-participation in free trade areas hinders the improvement of the apparel export efficiency coefficient (excluding NAFTA). Moreover, partner countries applying a high level of non-tariff barriers, especially technical barriers to trade can both promote and impede the apparel export efficiency of Vietnam.

The research results in the study can be useful for supporting the Vietnamese government as well as businesses in setting export goals and policies to improve the quality and the competitiveness of Vietnamese apparels. However, just referencing research is not enough to comprehensively develop the export of Vietnam's apparel industry. Firstly, the

purposeful sampling narrowed the scope of the research, leading to a relative and generalized result. In other words, Vietnamese Government and exporting companies need to conduct research on many other specific aspects related to exports including the development of infrastructure, Vietnam's transportation, influence of domestic demand or competition from other exporters, etc. Secondly, the TRE model in the paper uses independent variables that do not change over time. This makes it difficult

to evaluate data when, in fact, variables such as TBT always fluctuate in value over the years. Moreover, the results of testing this model only show the impact of TBT on export performance without mentioning other trade barrier variables. Finally, the research focuses on exporting apparels with HS code 61 to propose export for the whole industry. Expanding the study to include HS 62 and 63 will provide a more objective and accurate assessment of Vietnam's apparel export performance in general.

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