Market Share Forecast of Vietnam and of the World's Leading Textile and Garment Exporters by VAR Bayesian Model

Nguyen Thi Ngoc Diep[1,2], Tran Quang Canh[3(✉)], and Nguyen Ngọc Thach[4]

[1] University of Economics and Law, Ho Chi Minh City, Vietnam
diepntn@uel.edu.vn
[2] Vietnam National University, Ho Chi Minh City, Vietnam
[3] Faculty of Business Administration, Ho Chi Minh City University of Economics and Finance, Ho Chi Minh City, Vietnam
canhtq@uef.edu.vn
[4] Banking University of Ho Chi Minh City, 36 Ton That Dam Street, District 1, Ho Chi Minh City, Vietnam
thachnn@buh.edu.vn

Abstract. This article forecasts the export market share of textiles during the 2020–2030 period in 10 countries with the world's largest export market share of textiles in 2019. Using the Var Bayesian model and secondary data collected from 1988 to 2019, the export market share of textiles and garments in the world in 2019, as reported on the World Bank's website, includes Vietnam, the USA, Germany, Japan, China, England, France, Italy, the Netherlands, and Spain. The forecast results show that the export market share of textiles in four countries, including the USA, China, Japan, and Spain, tends to increase slightly and steadily. In comparison, the second group of six countries, including Germany, England, France, Italy, the Netherlands, and Vietnam, tends to reduce. From a policy perspective, the authors also offer some recommendations for how textile export enterprises should operate. They should actively prepare for production and human resources after the wave of employees leaving industry zones to avoid the pandemic, bringing effective manufacturing and exporting activities and maintaining the export market share of textiles. As a means of minimizing the harmful effects of the COVID − 19 epidemic, policymakers are called upon to diversify export markets, actively search for new markets, take advantage of the Free Trade Agreement, and implement harmonized dual − target strategies in order to promote economic growth.

Keywords: Textile · VAR Bayesian model · Vietnam

1 Introduction

Textile industry in Vietnam has a critical position in the development process, significantly contributing to socio − economic growth. This industry is not only to serve people's daily needs but also to create jobs for tens of thousands of domestic workers,

N. Ngoc Thach et al. (Eds.): *Optimal Transport Statistics for Economics and Related Topics*, SSDC 483, pp. 427–439, 2024.
https://doi.org/10.1007/978-3-031-35763-3_30

promote exports, and increase foreign investment attraction. Moreover, the textile industry promotes the development and is an input for many other economic sectors, such as agriculture and auxiliary industries. In recent years, Vietnam's textile and garment industry has taken a positive step; the increase in the average industrial production of the textile industry index from 2012 to 2020 reached 11.8% per year. Vietnam's textile and garment exports reached 29.81 billion USD, down 9.2% compared to 2019. Like other industries, Vietnam's textile and garment industry has also been negatively impacted by the COVID − 19 pandemic, which has seriously affected production, broken the supply of raw materials, and narrowed the market for garments. When consumers were only interested in essential utensils and epidemic prevention, the demand for textile products worldwide decreased.

Along with the efforts to research and produce successful vaccines and drugs for the treatment because of COVID − 19 in developed countries such as the USA, England, Russia, and China, the governments of countries worldwide have flexible reactions to limit the spread, gradually restricting the number of deaths while opening progressively to restore the economy, creating a psychology that works for workers in all economic sectors, including Vietnam's textile and garment industry. Specifically, in June and in the first six months of 2021, the textile and garment industry has more prosperous signals than last year, thanks to the production string recovering and traditional orders rising again. Consumer shopping needs in the US and Europe for clothing increased strongly when the economy was restored due to the gradual removal of the blockade. Some major export markets of Vietnam are progressively recovering and taking advantage of opportunities from signed free trade agreements (FTAs) and going into execution.

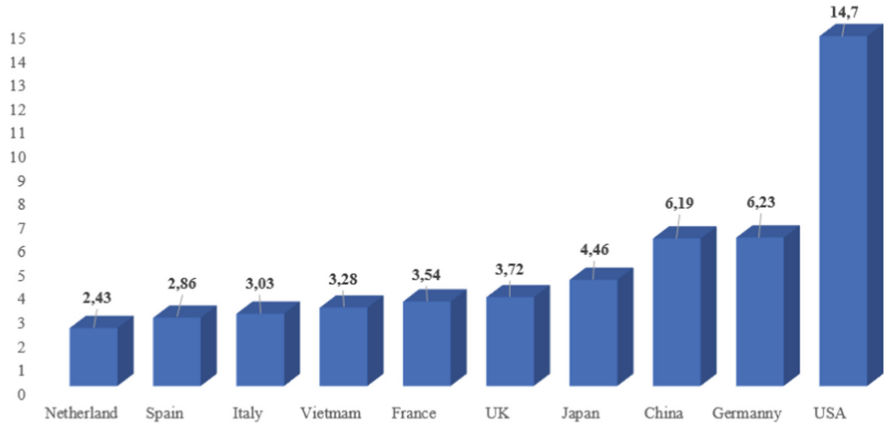


Fig. 1. Top 10 countries with textile and garment export market share in the world in 2019. Source: https://www.wto.org/

According to the WTO 2019 (Textiles and Clothing Exports by Country & Region US$000 2015 | WITS Data, n.d.), Vietnam's fabric export marketplace percentage is presently ranked seventh worldwide (Fig. 1). By the end of 2020, in line with the General Statistics Office of Vietnam (Ha, 2021a, 2021b), the markets of the United States, EU,

Japan, and Korea will have many high-quality symptoms, while many fabric firms will have export orders until the end of the first quarter of 2021. The Vietnam fabric enterprise index in June 2021 improved by 3.8% over the preceding month and 14.3% compared to the identical period in 2020. Moreover, the dress enterprise index improved by 3.4% and 7.9% compared to the preceding month and the identical period in 2020, respectively. In the first six months, the fabric manufacturing index improved by 8.6% compared to last year's period, and the dress enterprise improved by 8.9%. According to the Ministry of Industry and Trade (Ministry of Industry and Trade, 2021), Vietnam accounts for more than 20% of the market share of garments in the United States for the first time in decades. The reason is that garment labels have been transferring orders from China to Vietnam to avoid the influence of the US − China trade conflict.

The global textile market tends to recover due to economic support packages. With positive information on the deployment of the COVID − 19 epidemic prevention vaccine, the demand for items in general and apparel, in particular, has partly recovered. In addition, in 2021, textile enterprises were okay with a lack of raw materials. Large orders, combined with the advantages of the export market, have helped Vietnamese textiles gradually recover with export turnover growth every month while providing Vietnamese textile enterprises the flexibility to adapt to new business conditions. In particular, as the enterprise continues to invest in equipment, automation technology is also one factor contributing to the textile and garment industry's foundation to withstand the market's pressure for quality and delivery fast (Ministry of Industry and Trade, 2021).

In 2022, with the expectation of life returning to normal, the needs of people's shopping after a repressed year will grow again. This expectation helps fashion brands become more optimistic about business prospects, positively impacting traditional garment orders at Vietnamese factories. However, to improve production and business results, businesses must adjust, follow market demand, and move faster with market fluctuations to take advantage of opportunities. Businesses have been more concerned about the construction of domestic fabric supplies to exploit the advantages of the Vietnam − EU Free Trade Agreement (EVFTA), the Comprehensive Partner and Trans-Pacific Partnership Agreement (CPTPP), and the Vietnam Free Trade Agreement with England (UKVFTA). In particular, many businesses have exploited domestic production advantages to export to Europe, enjoying the advantage according to EVFTA. According to businesses, the opportunity to increase European exports has created a catalyst for manufacturers to invest in factories boldly and prepare and supply raw materials "Made in Vietnam" more (Ha, 2021a, 2021b).

This study was conducted to forecast the world's market share and the world's leading textile and garment exporters by approaching VAR Bayes to report the textile import demand. Vietnam and ten countries have the leading textile exports in the world (according to WTO data in 2019), including the US, Japan, China, Germany, England, France, Italy, the Netherlands, Spain, and Vietnam. Research results will help Vietnamese textile enterprises identify their export market share in the coming years. Research results also provide appropriate policies to reserve capital and raw materials and attract textile human resources to ensure export volume, especially if they can respond promptly and ensure production progress with the effects of the new species of SARS − CoViD − 2

virus. Part 2 of the article shows the theoretical basis, Part 3 is a research method, Part 4 is the study result, and Part 5 is the policy implications.

2 Literature Review

The export market for ready-made garments (RMG) is led by developing countries, mainly China, Bangladesh, Vietnam, and India. Many countries are considering the emerging economies expected to lead the world in the coming decades (Barua et al., 2018). China is predicted to overtake the US as the most prominent global fashion market. Middle – class consumers in India are part of a growing market. India is growing as producers are also becoming increasingly shrewd at technological innovation (Megersa, 2019).

Textiles are one of the traditional products that not only bring high socio – economic value to Vietnam but also contribute significantly to the process of industrialization and modernization of the country. Vietnam's textile and garment exports in recent years have continuously increased in the number, type, and value of export turnover, making Vietnam one of the ten countries with the most prominent textile export turnover (Data in 2019).

Vietnam's accession to the WTO in 2010 It can be said that when entering the world textile and garment market, especially the EU, Japan, and US markets by export, the biggest and most formidable competitor for Vietnamese textile and garment enterprises is China (Do, 2021).

The increased market power of Vietnamese producers depended largely on global buyers' views of the risks of sourcing from China (Goto et al., 2011). Vietnam is a supply of 25% of goods for VF Corporation (VFC), the world's largest garment company (according to figures in 2018), with subsidiaries including Vans, the North, Timberland, Wrangler, and Eastpak (Megersa, 2019).

3 Methodology

3.1 Data

Research data shows the export market share of textiles and garments of the ten countries with the largest market share in the world in 2019 on the Worldbank's website. Secondary data collected from 1988 to 2019 covers the share of textile and garment exports of the US, Germany, Japan, China (including Hong Kong), the UK, France, Italy, the Netherlands, Spain, and Vietnam (wits.worldbank, n.d.)

3.2 Forecast Method

3.2.1 Bayesian Var Model

In this article, we used the Bayesian Var model. Bayes' analysis requires knowledge about pre – distribution attributes, capabilities, and later (Kreinovich et al, 2019; Nguyen T.N et al., 2019; Thach N.N et al., 2021; Thach N.N et al., 2022). Previously, external distribution information was based on the trust of researchers about the concerned parameters.

Possibly, the data information is available in the sample probability distribution function (PDF). Combine previous distribution through Bayes' theorem with data capabilities leading to the subsequent distribution. In particular, denote the parameters of interest in a given model by $\theta = (\beta, \Sigma_\epsilon)$, and the data by y. The prior distribution is $\pi(\theta)$, and the likelihood is s $l(y|\theta)$, then the posterior distribution $\pi(y|\theta)$ is the distribution of θ given the data y and may be derived by

$$\pi(y|\theta) = \frac{\pi(\theta)l(y|\theta)}{\int^{\pi}(\theta)l(y|\theta)d\theta}$$

To relate this general framework to Bayesian VAR (BVAR) models, suppose that we have the VAR(p) model:

$$y_t = a_0 + \sum\nolimits_{j=1}^{p} A_j y_{t-j} + \epsilon_t \tag{1}$$

where y_t for $t = 1, \ldots,$ T is an $m \times 1$ vector containing observations on m v different series and ϵ_t is an $m \times 1$ vector of errors where assume ϵ_t is i.i.d. $N(0, \Sigma_\epsilon)$. For compactness we may rewrite the model as:

$$Y = XA + E \tag{2}$$

or

$$y = (I_m \otimes X)\theta + e \tag{3}$$

where Y and E are $T \times m$ matrices and $X = (x_1, \ldots, x_t)'$ is a $T \times (mp + 1)$ matrix for $x_t = (1, y'_{t-1}, \ldots, y'_{t-q})$, I_m is the identify matrix of dimension m, $\theta = vec(A)$, and $e \sim N(0, \Sigma_\epsilon \otimes I_T)$. Using Eq. (3) the likelihood function is

$$l(\theta, \Sigma_\epsilon) \propto |\Sigma_\epsilon \otimes I_T|^{-\frac{1}{2}} \exp\left\{-\frac{1}{2}(y - (I_m \otimes X)\theta)'(\Sigma_\epsilon \otimes I_T)^{-1}(y - (I_m \otimes X)\theta)\right\} \tag{4}$$

Let assume Σ_ϵ is known and a multivariate normal prior for θ:

$$\Pi(\theta) \propto |V_0|^{-\frac{1}{2}} \exp\left\{-\frac{1}{2}(\theta - \theta_0)'V_0^{-1}(\theta - \theta_0)\right\} \tag{5}$$

where θ_0 is the prior mean and V_0 is the prior covariance. When we combine this prior with the likelihooh function in Eq. (4), the posterior density can be written as

$$\Pi(\theta|y) = \exp\left\{-\frac{1}{2}((V_0^{-1/2}(\theta - \theta_0))'(V_0^{-1/2}(\theta - \theta_0)) + \left\{\left(\Sigma_\epsilon^{-1/2} \otimes I_T\right)y - (\Sigma_\epsilon^{-1/2} \otimes X)\theta\right\}'\left\{\left(\Sigma_\epsilon^{-1/2} \otimes I_T\right)y - \left(\Sigma_\epsilon^{-1/2} \otimes X\right)\theta\right\}\right\} \tag{6}$$

which is a multivariate normal pdf For simplicity, define

$$\omega \equiv \begin{bmatrix} V_0^{-1/2}\theta_0 \\ \left(\Sigma_\epsilon^{-1/2} \otimes I_T\right)y \end{bmatrix}$$

$$W \equiv \begin{bmatrix} V_0^{-1/2} \\ (\Sigma_\epsilon^{-1/2} \otimes X) \end{bmatrix} \tag{7}$$

then the Exponent in Eq. (6) can be written as

$$\begin{aligned} \Pi(\theta|y) &\propto \exp\left\{-\frac{1}{2}(\omega - W\theta)'(\omega - W\theta)\right\} \propto \\ \exp&\left\{-\frac{1}{2}\left(\theta - \overline{\theta}\right)' W' W \left(\theta - \overline{\theta}\right) + \left(\omega - W\overline{\theta}\right)'(\omega - W\overline{\theta})\right\} \end{aligned} \tag{8}$$

where the posterior mean $\overline{\theta}$ is

$$\overline{\theta} = (W'W)^{-1}W'\omega = \left[V_0^{-1} + \left(\Sigma_\epsilon^{-1} \otimes X'X\right)\right]^{-1}\left[V_0^{-1}\theta_0 + \left(\Sigma_\epsilon^{-1} \otimes X\right)' y\right] \tag{9}$$

Since Σ_ϵ is known, the second term of Eq. (8) has no randomness about $\overline{\theta}$. The posterior there fore may be summarized as

$$\begin{aligned} \pi(\theta|y) &\propto \exp\left\{-\frac{1}{2}\left(\theta - \overline{\theta}\right)' W' W \left(\theta - \overline{\theta}\right)\right\} \\ &= \exp\left\{-\frac{1}{2}\left(\theta - \overline{\theta}\right)' \overline{V}^{-1} \left(\theta - \overline{\theta}\right)\right\} \end{aligned} \tag{10}$$

and the posterior covariance $\overline{V}$ is given as

$$\overline{V} = \left[V_0^{-1} + \left(\Sigma_\epsilon^{-1} \otimes X'X\right)\right]^{-1} \tag{11}$$

3.2.2 KPSS (Kwiatkowski-Phillips-Schmidt-Shin Test)

First, test for stationarity of the time series by KPSS test.

The KPSS test differs from the other unit root tests described here in that the series is assumed to be (trend −) stationary under the null. The KPSS statistic is based on the residuals from the OLS regression of Y_t on the exogenous variables x_t:

$$y_t = x_t'\delta + u_t \tag{12}$$

The LM statistic is be defined as:

$$LM = \sum S \frac{(t)^2}{(t^2 f_0)} \tag{13}$$

where, is an estimator of the residual spectrum at frequency zero and where is a cumulative residual function:

$$S(t) = \sum_{r=1}^{t} u_t \tag{14}$$

Based on the residuals $\widehat{u_t} = u_t - x_t'\delta(0)$. We point out that the estimator of used in this calculation differs from the estimator for used by GLS detrending since it is based on a regression involving the original data and not on the quasi-differenced data.

3.2.3 Parameters for Bayesian VAR Model

Set parameters for Bayesian VAR model:

The Prior type: Litterman/Minnesota:

Early work on Bayesian VAR priors was done by researchers at the University of Minnesota and the Federal Reserve Bank of Minneapolis (see Litterman, 1986; and Doan, Litterman, and Sims, 1984), and these early priors are often referred to as the "Litterman prior" or the "Minnesota prior." This family of priors is based on the assumption that Σ_ϵ is known; replacing Σ_ϵ with its estimate $\hat{\Sigma}_\epsilon$. This assumption yields simplifications in prior elicitation and computation of the posterior. In this paper, we choose the diagonal VAR as the estimator of Σ_ϵ.

Diagonal VAR: $\hat{\Sigma}_\epsilon$ is restricted to be a diagonal matrix (as in the univariate VAR estimator). However, the diagonal elements of the matrix are calculated from the full classical VAR (i.e., the diagonal elements are equal to those in the full VAR method, and the non $-$ diagonal elements are set equal to zero).

Since s Σ_ϵ replaced by $\hat{\Sigma}_\epsilon$, we need only specify prior for VAR coefficient θ. The litterman prior assues that the prior of θ is $\theta \sim N(\theta_0, V_0)$.

$\theta_0 = 0$ (where the hyper-parameter $\mu_1 = 0$, which indicates a zero mean model) and nonzero prior covariance $V_0 \neq 0$. Note that although the choice of zero mean could lessen the risk of over-fitting, theoretically any value for μ_1 is possible.

To explain the Minnesota/Litterman prior for the covariance, note that the explanatory variables in the VAR in any equation can be divided into their lags of the dependent variable, lags of the other dependent variables, and finally, any exogenous variables, including the constant term. The elements of corresponding to exogenous variables are set to infinity (i.e., no information about the exogenous variables is contained within the prior).

The remainder of V_0 is then a diagonal matrix with its diagonal elements v_{ij}^l for $l = 1, \ldots, p$

$$v_{ij}^l = \begin{cases} \left(\frac{\lambda_1}{l^{\lambda_3}}\right)^2 \; for \; (i = j) \\ \left(\frac{\lambda_1 \lambda_2 \sigma_i}{l^{\lambda_3} \sigma_i}\right)^2 for \; (i \neq j) \end{cases} \tag{15}$$

where σ_i^2 is the i-th diagonal element of Σ_ϵ.

This prior setting simplifies the complicated choice of specifying all the elements of V_0 down to choosing three scalars λ_1, λ_2 and λ_3. The first two scalars λ_1 and λ_2 are overall tightness and relative cross $-$ variable weight, respectively. λ_3 captures the lag decay that, as lag length increases, coefficients are increasingly shrunk toward zero.

Note that changes in these hyper $-$ parameter scalar values may lead to smaller (or larger) variances of coefficients, which is called tightening (or loosening) the prior. The exact choice of values for these three scalars depends on the empirical application, so researchers can make trials with different values for themselves. Litterman (1986) provides additional discussion of these choices.

Given this choice of prior, the posterior for takes the form

$$\theta \sim N(\overline{\theta}, \overline{V})$$

where

$$\overline{V} = \left[V_0^{-1} + \left(\hat{\Sigma}_\epsilon^{-1} \otimes X'X\right)\right]^{-1} \tag{16}$$

and

$$\overline{\theta} = \overline{V}\left[V_0^{-1}\theta_0 + \left(\hat{\Sigma}_\epsilon^{-1} \otimes X\right)' y\right] \tag{17}$$

A primary advantage of the Minnesota/Litterman prior is that it leads to simple posterior inference. The prior does not, however, provide a full Bayesian treatment of Σ_ϵ as an unknown, so it ignores uncertainty in this parameter.

Degrees of Freedom Corection

This paper, we chosed:

The Prior specification*:* Hyper − parameters,

Coefficient Priors: $\mu_1 = 0.$, Residual Priors: $\lambda_1 = 0.01.$; $\lambda_2 = 0.99$ and $\lambda_3 = 1$.

With the established parameters, we estimate the Bayesian VAR model**.**

3.2.4 Diagnostic the Appropriateness of the Estimated Bayesian VAR

We diagnostic the appropriateness of the estimated Bayesian VAR through:

Stationary Test

AR *Roots* Table the inverse roots of the characteristic AR polynomial; see Lütkepohl (1991). The estimated VAR is stable (stationary) if all roots have a modulus of less than one. If the VAR is not stable, specific results are not valid.

Residual Tests

To check the stability of the residuals, we use the autocorrelation diagram. Suppose the test results show that Q − statistics are insignificant at all lags, indicating no significant serial correlation in the residuals. In that case, the model's residuals are white noise.

3.2.5 Predict the Values of the Variables up to 2030

After diagnosing the appropriateness, use the Bayesian VAR model to predict the values of the variables up to 2030.

4 Research Results

4.1 Test for Stationarity

Stationary test results (Table 1) show that the time series are stationary at the first difference, but VI stops at the second difference.

4.2 Determine the Lag Intervals

Base on Akaike information criterion (AIC), we determine the lag intervals for endogenous variables at 1.

Table 1. Kwiatkowski-Phillips-Schmidt-Shin test statistic

Time series	Asymptotic critical values*: 5% level	0.1460	Time series	Asymptotic critical values*: 5% level	0.1460
	LM − Stat			LM − Stat	
D(US)	0.1499		D(FR)	0.5000	
D(GE)	0.1532		D(IT,2)	0.2343	
D(JA)	0.2037		D(NE,2)	0.5000	
D(CH,2)	0.3552		D(FR)	0.5000	
D(UK,2)	0.3380		D(VI,2)	0.1983	

Source: Analytical results from Eviews, 2022

4.3 Diagnostic the Appropriateness of the Estimated Bayesian VAR

4.3.1 Stationary Test

The test results show that all modulus values are less than 1, VAR satisfies the stability condition (Table 2).

Table 2. Stationary test

Roots of Characteristic Polynomial	
Endogenous variables: D(US) D(GE)	
D(JA) D(CH,2) D(UK,2) D(FR) D(IT,2)	
D(NE,2) D(SP) D(VI,2)	
Root	Modulus
−0.004588	0.9820
−0.004588	0.9820
−0.726307	0.9080
−0.726307	0.9080
0.403437	0.8591
0.403437	0.8591
−0.446040	0.8518
−0.446040	0.8518
0.011970	0.8317

(*continued*)

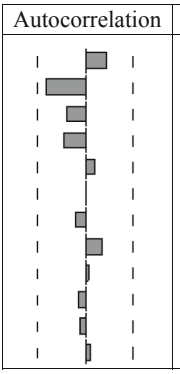
Table 2. (*continued*)

0.011970	0.8317
−0.686121	0.6861
0.473709	0.6109
0.473709	0.6109
0.592474	0.5959
0.592474	0.5959
−0.542744	0.5427
0.178066	0.5043
0.178066	0.5043
−0.382252	0.4441
−0.382252	0.4441
No root lies outside the unit circle	
VAR satisfies the stability condition	

Source: Analytical results from Eviews, 2022

4.3.2 Residual Tests

To check the stability of the residuals, we use the autocorrelation diagram. The test results show that Q − statistics are not significant at all lags, indicating no significant serial correlation in the residuals; the residuals are a stationary series (Fig. 2).



	AC	PAC	Q–stat	Prob
1	0.161	0.161	0.8657	0.353
2	−0.310	−0.345	4.1548	0.125
3	−0.150	−0.032	4.9562	0.175
4	−0.161	−0.268	5.9121	0.206
5	0.066	0.106	6.0816	0.298
6	0.006	−0.222	6.0832	0.414
7	−0.070	0.001	6.2901	0.506
8	0.135	0.057	7.0821	0.528
9	0.017	−0.060	7.0956	0.627
10	−0.061	−0.009	7.2750	0.699
11	−0.036	−0.063	7.3401	0.711
12	0.035	0.115	7.4040	0.830

Fig. 2. Residual autocorrelation diagram. Source: Analytical results from Eviews, 2022

4.4 Predict the Values of the Variables up to 2030

Table 3 shows the forecast of textile export market share in the period 2020 − 2030 for Vietnam, the USA, Germany, Japan, China, England, France, Italy, the Netherlands, and

Table 3. Market share forecast

YEAR	CH_F	FR_F	GE_F	IT_F	JA_F	NE_F	SP_F	UK_F	US_F	VI_F
2020	9.206	3.503	5.577	3.146	3.369	1.997	2.908	3.676	14.32	3.155
2021	8.433	3.559	5.896	2.982	3.039	2.169	2.838	2.846	15.19	3.267
2022	7.855	3.427	6.493	2.886	3.966	2.141	3.005	2.376	15.05	3.454
2023	9.077	2.759	5.297	2.538	4.430	1.660	2.725	1.844	16.18	3.449
2024	9.354	2.850	4.997	2.585	4.102	1.548	2.711	1.541	15.92	3.304
2025	9.932	3.235	5.295	2.828	3.070	1.637	2.954	1.267	15.04	3.488
2026	9.098	3.237	5.822	2.752	3.288	1.795	3.055	0.7346	15.25	3.706
2027	9.880	2.711	5.118	2.492	3.878	1.386	2.978	0.4814	16.04	3.659
2028	11.210	2.418	3.973	2.372	3.355	1.006	2.803	0.009	16.93	3.584
2029	10.010	2.855	4.609	2.581	2.956	1.283	3.023	−0.5133	16.29	3.704
2030	9.752	2.893	4.969	2.615	3.191	1.352	3.221	−0.8748	15.84	3.938

Source: Analytical results from Eviews, 2022

Spain. The forecast results show that the export market shares of three countries, Spain, the US, and Vietnam, tend to increase slightly and stabilize. The other seven countries, including China, France, Germany, Italy, Japan, the Netherlands, and England, tend to decrease.

For Vietnam, with the positive epidemic prevalence in 2020 of the Government, the Government has maintained that dual and both anti − epidemic and economic development has brought positive results. According to the General Statistics Office of Vietnam (Ha, 2021a, 2021b), the world economy witnessed the most severe recession in history, the growth of significant economies decreased profoundly due to the harmful effects of the Covid − 19 epidemic, but Vietnam's economy still maintained growth with the growth rate of GDP estimated to reach 2.91%, bringing Vietnam to become a fourth largest economy in Southeast Asia (after Indonesia 1,088.8 billion USD; Thailand 509.2 billion USD and Philippines 367.4 billion USD).

However, 2021 will see the outbreak and collapse of many health systems in many countries due to the Delta mutation. This variant causes more infections and spreads faster than previous forms of SARS − NCOV − 2 (Nguyễn, N. D, 2022; Nguyễn, N. D., & Nguyễn, Y., 2022). Moreover, this outbreak took a heavy toll in Vietnam between May and October 2021 with widespread outbreaks. In industrial parks, the epidemic spread rapidly, especially in industrial zones with textile factories with tens of thousands of workers, causing a wave of workers' migration from industrial zones to the countryside. The consequences of this wave of migration caused a series of orders from textile companies to move to other production factories in the region and other countries around the world.

The results in Table 3 show that the market share of Vietnam's textile and garment exports still tends to increase gradually in the years 2022–2030. This result is similar to the study by Wei et al. (2021), which shows that the pandemic can increase the export

positions of countries; if the disease is adequately controlled, it will be a good opportunity for exports during this period, and vice versa.

5 Conclusion

Using the VAR Bayesian model and the data for the export market share of textiles collected from the World Bank, the author's team has forecast the export market share of textiles in the period 2020 − 2030 in 10 countries with the most prominent part (data in 2019). The research results show that the COVID − 19 pandemic has affected the export market share of textiles and garments. The forecast results show that the export market shares of three countries, Spain, the US, and Vietnam, tend to increase slightly and stabilize. The other seven countries, including China, France, Germany, Italy, Japan, the Netherlands, and England, tend to decrease.

The research results show that Vietnam's textile and garment export market share will continue to increase in the coming years. The COVID − 19 pandemic is the leading cause affecting the export value of Vietnam's textiles and garments. The findings show that the Vietnamese government needs to quickly implement measures to deal with the pandemic, take advantage of export opportunities during the pandemic, and bring many economic benefits.

The current perspective on the current epidemic situation and the application of instant responding measures from time to time to control the epidemic in parallel with economic development is essential. Conduct harmonization between priority prevention and control of epidemics and socio − economic development; only make ways of stretching and blocking when it is essential and within the scope of consistency and enforcement of the goal to continue to maintain macroeconomic stability; control inflation; ensure large balances of the economy; Implementing harmony, successful double target prevention and control of COVID − 19 epidemic, has promoted socio − economic development.

Textile and garment exporters can use this research result to proactively better prepare for production and prepare human resources after the wave of workers leaving industrial zones to avoid the end of the epidemic. Better preparation will help textile and garment exporters to be more efficient in their production and export activities and maintain their market share in textile exports.

Vietnam needs to focus on diversifying export markets, actively seeking new markets, and effectively exploiting opportunities from FTAs. Monitoring developments, analyzing and forecasting the impact of the Covid − 19 pandemic on the value of Vietnam's exports will contribute to updating the economic growth scenario and helping Vietnam to remove difficulties and obstacles in the export process. Ensure convenient and safe customs clearance to stabilize and develop the economy during the Covid − 19 pandemic.

References

Barua, S., Kar, D., Mahbub, F.B.: Risks and their management in ready-made garment industry: evidence from the world's second largest exporting nation. J. Bus. Manag. **24**, 75–103 (2018)

Do, K.D.: Evaluating the competitiveness of the vietnam textile and garment industry. J. Int. Bus. Manag. **4**(10), 1–13 (2021). https://doi.org/10.37227/JIBM-2021-08-1176

EViews Help: http://www.eviews.com/help/helpintro.html#page/content/preface.html (n.d.). Retrieved 7 Nov 2021

Goto, K., Natsuda, K., Thoburn, J.: Meeting the challenge of China: the Vietnamese garment industry in the post MFA era. Global Netw. **11**(3), 355–379 (2011). https://doi.org/10.1111/j.1471-0374.2011.00330.x

Ha, T.: Kinh tế Việt Nam 2020: Một năm tăng trưởng đầy bản lĩnh. General Statistics Office of Vietnam. https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2021a/01/kinh-te-viet-nam-2020-mot-nam-tang-truong-day-ban-linh/ (2021a)

Ha, T.: Triển vọng kinh doanh của ngành dệt may trong năm 2020. General Statistics Office of Vietnam. https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2021b/07/trien-vong-kinh-doanh-cua-nganh-det-may-trong-nam-2020/ (2021b)

Kreinovich, V., Thach, N.N., Trung, N.D., Thanh, D.V. (eds.): Beyond Traditional Probabilistic Methods in Economics. Springer International Publishing, Cham (2019)

Megersa, K.: Structure of the Global Ready-Made Garment Sector. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14705 (2019)

Ministry of Industry and Trade: Báo cáo Xuất nhập khẩu Việt Nam 2020: Kho thông tin hữu ích cho doanh nghiệp. https://congthuong.vn/bao-cao-xuat-nhap-khau-viet-nam-2020-kho-thong-tin-huu-ich-cho-doanh-nghiep-155486.html (2021)

Nguyễn, N.D.: Export and application of SARIMA model for forecasting the value of Vietnam export during Covid-19. VNUHCM J. Econ. Bus. Law **6**(2), 2832–2839 (2022). https://doi.org/10.32508/stdjelm.v6i2.891 http://stdjelm.scienceandtechnology.com.vn/index.php/stdjelm/article/view/891

Nguyen, T.N., Kosheleva, O., Kreinovich, V., Nguyen, H.P.: Blockchains beyond bitcoin: towards optimal level of decentralization in storing financial data. In: Kreinovich, V., Thach, N.N., Trung, N.D., Van Thanh, D. (eds.) Beyond Traditional Probabilistic Methods in Economics, pp. 163–167. Springer International Publishing, Cham (2019). https://doi.org/10.1007/978-3-030-04200-4_12

Nguyễn, N.D., Nguyễn, Y.: Development of supporting industries towards production and export autonomy in Ho Chi Minh City. VNUHCM J. Econ. Bus. Law **6**(3), 3386–3395 (2022). https://doi.org/10.32508/stdjelm.v6i3.1031; http://stdjelm.scienceandtechnology.com.vn/index.php/stdjelm/article/view/1031

Textiles and Clothing Exports by country & region US$000 2015 | WITS Data. (n.d.). https://wits.worldbank.org/CountryProfile/en/Country/WLD/Year/2015/TradeFlow/Export/Partner/all/Product/50-63_TextCloth. Retrieved 29 Oct 2021

Thach, N.N., Kreinovich, V., Trung, N.D. (eds.): Data Science for Financial Econometrics, vol. 898. Springer International Publishing, Cham (2021). https://doi.org/10.1007/978-3-030-48853-6

Thach, N.N., Kreinovich, V., Ha, D.T., Trung, N.D. (eds.): Financial Econometrics: Bayesian Analysis, Quantum Uncertainty, and Related Topics, vol. 427. Springer International Publishing, Cham (2022). https://doi.org/10.1007/978-3-030-98689-6

Wei, P., Jin, C., Xu, C.: The influence of the COVID-19 pandemic on the imports and exports in China, Japan, and South Korea. Front. Public Health **9**, 682693 (2021). https://doi.org/10.3389/fpubh.2021.682693

wits.worldbank (n.d.) Textiles and Clothing Exports by country & region. Wits.Worldbank.Org. https://wits.worldbank.org/CountryProfile/en/Country/WLD/Year/2019/TradeFlow/Export/Partner/all/Product/50-63_TextCloth. Retrieved 21 Sep 2021