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IMPACT OF CHINA AND THE USA'S ECONOMY ON VIETNAM'S ECONOMY DURING THE COVID-19 PANDEMIC - AN EMPIRICAL ANALYSIS FROM THE STOCK MARKETS

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The USA and China have been the leading trade and investment partners of Vietnam for a long time. Since the end of 2019, the Covid-19 pandemic, which originated from Wuhan - China, has spread on a large scale, had an impact on the stock markets of Vietnam, China and the USA, as well as the relationship among those markets. The Copula method is used in this study to investigate the dependence structure between Vietnamese stock market and, respectively, the USA and the Chinese stock markets during the Covid-19 pandemic. The research results confirm that before the pandemic, the dependence degree between the Vietnamese stock market and each stock market the USA or China stock markets are weak. However, the Covid-19 pandemic has increased the dependence degree between the Vietnamese stock market and each of the two leading stock markets in the world sharply.

Keywords: *Economic impact, stock market, Covid-19.*

JEL Classifications: *E31, E32, F62, G32, G38*

1. Introduction

The Covid-19 pandemic, which originated from Wuhan - China, began to spread on a large scale in late 2019 and early 2020. In Vietnam, Covid-19 pandemic started on January 20th 2020, with the first confirmed case, who is a 35-year-old man who had returned from China a few days earlier. In the context of the pandemic, the Government and the National Steering Committee for Covid-19 Prevention and Control, the Ministry of Health have drastically implemented active epidemic measures, necessary isolation, monitoring and restricting people coming from epidemic areas, closing borders and health declarations. Crowded gatherings are restricted, temperature measurement is carried out,

and hand washing with soap or sanitizer is required to combat the spread of the pandemic.

Since the economic crisis of 2008-2009, the world economy needs a quantity of years to recover. The period of 2015-2019 has been marked as a period of strong recovery of the world economy. Leading countries such as the USA, Japan and several emerging countries grew strongly, while China became the second largest economy in the world. However, entering 2020, after the Covid-19 pandemic spread and brought negative impacts to the growth of all economies around the world, almost major countries in the world had growth decline, even at approximately 8-10%. According to the assessment of economic experts, the most severely

affected economic components are the air transport industry, the textile industry, the event industry and the food service industry (Henderson and Platt, 2020). Consequently, investment, production and business, the development of financial and securities markets are also impacted. The influence of the Covid-19 pandemic caused the Chinese economy to grow at minus 6.8% in the first quarter of 2020. However, the economy of China then recovered in the following quarters, and reached by overall 2.30% in 2020. Simultaneously, the Covid-19 pandemic induced the USA economic growth to minus 3.5% which was the lowest since World War II, as well as lower than during the financial crisis in 2009. It is forecasted that it will take a few years for the USA economy to recover totally (Harriet Torry, 2021). Meanwhile, there are quite a few other economies with positive growth in 2020, namely China and Vietnam (Zhou, 2021).

For Vietnam, the Covid-19 pandemic has indeed had an impact on the economy. The Government only applies social distancing measures, zoning the epidemic in areas at risk, to realize the dual goal: fighting against the epidemic and developing the economy (Ministry of Health, 2020). In order to get over difficulties for production and business activities as well as social security ensurement, the Government requested local ministries and sectors to speed up the progress and implement solutions and directions of the Prime Minister. However, there still exist assessments of risks for the Vietnamese economy such as a highly open economy, vulnerable to external influences, and in the context of the USA-China trade war, which has had both positive and negative impacts on Vietnam since 2018. So far, there have not been domestic studies to investigate the impact of the USA and Chinese economies on Vietnam's economy in the context of the Covid-19 pandemic, specifically the impact on the stock market's volatility.

In addition to the introduction, the analysis consists of the following parts: section 2 presents the literature review of the study, section 3 deals with research methods and data. The empirical results are presented in section 4. Finally, section 5 is devoted to conclusions.

2. Literature review

The economic development of each country is associated with the expansion of the stock market. As known, the stock market is an important long-term capital mobilization channel for businesses and the government. The stock markets of different countries are connected interactively. Recently, research on long-term equilibrium relationship between stock indexes was studied by Ahlgren and Antell (2002), Taihai et al. (2004), Narayan and Smyth (2005). The link between stock markets in developed countries was investigated in Wong et al. (2004). Valadkhani et al. (2008) studied the relationship between Asian stock markets and developed markets. These studies showed that developed countries' markets were increasingly integrating with each other, and emerging markets were increasingly integrating with developed markets.

More specifically, Ahlgren and Antell (2002) used a dataset consisting of stock market indices in Finland, France, Germany, Switzerland, the UK and the US, from January 1980 to February 1997. Thanks to Johansen's maximum likelihood cointegration test (ML) and likelihood ratio (LR), the authors showed that there was no co-integration relationship between stock prices across countries. Taihai et al. (2004) studied the monthly stock price indexes of the G7 countries, from March 1978 to December 1997 using the vector error correction model (VECM). The results of the cointegration test showed that there was one trend $I(2)$ and two trends $I(1)$ between the stock returns. Also using a vector error correction model, D'Ecclesia and Costantini (2006) studied monthly stock index data for the USA, the UK, Japan and Canada for the period from 1978 to 2002. The results revealed that there is a long-run equilibrium relationship between stock indexes of countries. In another study, Narayan and Smyth (2005) studied the monthly stock indexes of New Zealand and G7 countries using the co-integration tests of Johansen, Gregory and Hansen. Johansen's test showed that there was no long-term equilibrium relationship between the New Zealand stock market index and any other country's stock market index. While, the Gregory and Hansen tests showed that the New Zealand stock market index had a co-integrated relationship with the USA stock

market index but had no co-integrated relationship with the stock market indexes of other countries.

Similarly, co-integration test was also used by Wong et al. (2004) to analyze stock indices in the USA, the UK, Japan, Malaysia, Thailand, Korea, Taiwan, Singapore and Hong Kong stock markets, from January 1st 1981 to December 31st 2002, to demonstrate that there was a co-movement between several markets, the interdependence between markets has increased dramatically after the 1987 stock market crisis and the 1997 Asian financial crisis. In addition to the above-mentioned methods, Valadkhani et al. (2008) also used the principal component method and the maximum likelihood method on monthly stock returns of 13 countries including Australia, Germany, Hong Kong, Japan, Indonesia, Malaysia, Korea, Singapore, Philippines, Taiwan, the UK, Thailand and the USA, during the period from December 1987 to April 2007. The results of factor analysis showed evidence that the returns of some Asian stock markets were closely correlated with each other and so were the returns of some developed countries.

In the relationships between the stock markets, a pattern that is increasingly mentioned in a great deal of studies is the dependency structure between markets. The copula method has been shown to have many advantages and to be helpful in showing good results. Some recent studies have used the copula method to study the dependency structure between the stock market of one country and the stock market of other countries such as Bartram et al. (2007), Turgutly and Ucer (2010), Boubaker and Salma (2011). Specifically, Bartram et al. (2007) studied 17 European stock market indexes in the period of 1994-2003 using a dynamic copula model and found that only the dependence between major markets increased after the introduction of a common currency, such as the markets of France, Germany, Italy, the Netherlands and Spain. The combined model of Gauss, Gumbel and Gumbel survival copulas was used by Turgutly and Ucer (2010) to study monthly stock market indexes of the top 3 major markets (the USA, the UK, Japan) and 9 emerging stock markets (Greece, Turkey, Argentina, Brazil, Mexico, Malaysia, Korea, Philippines and Thailand), from January 1988 to August 2006. The

authors found that no pair of stock market indexes showed an upper-tailed dependency structure, while all pairs of stock market indexes showed a lower-tailed dependency structure. Emerging markets in Europe all had a dependence structure with the world's leading markets. Continuously, Boubaker and Salma (2011) studied the returns of S&P 500 stock index and 15 other stock indices in the periods before and during the subprime crisis and showed evidence of spillovers across markets after the global financial crisis. The spillover effect was expressed in the sharp increase of the dependence parameters measured by the copula parameters between the markets during the crisis compared to the pre-crisis period.

According to the authors' analysis, there has not been an in-depth study on the dependence structure between markets using the copula method in Vietnam's stock market in recent years. Most recently, Wang (2011) built a two-variable EGARCH model with dynamic conditions for the period from 2006 to 2009 and asserted that the Chinese stock market brought many risks of contagion to the Vietnamese market rather than the US stock market. And moreover, these effects have been stronger since the mortgage crisis. Simultaneously, the author advised investors to pay attention to the financial situation not only in the domestic market but also in neighboring markets. In another study, Chang and Su (2010) used the excess error correction model and the GARCH model to study the relationship between Vietnam's stock market and its main trading partners, including the USA, Singapore, Japan and China. The results showed that Vietnam's stock market was affected by the Japanese and Singaporean markets. Volatility on the stock market of Vietnam and other countries had asymmetrical effects. These results suggested that individual investors and financial institutions should keep long-term investment portfolios on the Vietnamese stock market.

In the context of research on Vietnam's stock market in relation to the leading stock markets in the world and in the region, especially the USA and Chinese stock markets in the current situation under the impact of the Covid-19 pandemic, the article has filled the empirical gap, thereby making some rec-

ommendations for interested investors and policy makers.

3. Methodology and research data

3.1. Methodology

In this study, the author uses the copula method to assess the impact of the Chinese and the USA stock markets on Vietnam's stock market during the Covid-19 pandemic. The Student copula function, which is the function chosen to be implemented in a great amount of empirical studies on stock markets (see Guizhou et al., 2018; Laura and Sonia, 2020). Copula is the multivariable distribution function generated from the marginal distribution functions of random variables. This method was also used in Thuy (2019) and Thuy et al. (2019).

3.1.1. Definition of copula (Copula - McNeil et al. (2005) page 198): A 2-dimensional copula (or 2-copula) is a function C whose domain is $[0;1] \times [0;1]$, and $C(x) \in [0;1]$ satisfies the following properties:

(i). $C(x) = 0, \forall x \in [0;1]^2$ if at least one coordinate of x is 0.

(ii). $C(1,x) = C(x,1) = x, \forall x \in [0;1]$.

(iii). $(a_1, a_2), (b_1, b_2) \in [0;1]^2$ with $a_1 \leq b_1, a_2 \leq b_2$, so we have:

$$C(a_2, b_2) - C(a_1, b_2) - C(a_2, b_1) + C(a_1, b_1) \geq 0$$

The copula function is as a composite function from the marginal distribution functions of a random vector to the simultaneous distribution function of those marginal distribution functions. This feature makes it possible to study the dependence structure between random variables even if they are not independent and identically distributed. Sklar's theorem is useful in studying the dependence structure and measuring the risk of a portfolio whose assets' returns are not independent and identically distributed.

3.1.2. Sklar theorem (McNeil et al. (2005), page 200) Let $F_1(x_1), F_2(x_2)$ be, respectively, marginal distribution functions of X_1, X_2 . Then there is a copula C such that:

$$F(x_1, x_2) = C(F_1(x_1), F_2(x_2)), \text{ with } \forall (x_1, x_2) \in \mathbb{R}^2 \quad (1)$$

If F_1, F_2 are continuous, then C is unique. Conversely, if C is a copula function, F_1, F_2 are, respectively, the distribution functions of X_1, X_2 then F determined as in (1) is a multivariate distribution function whose marginal distribution functions are F_1, F_2 . The theorem addresses the main idea in

describing the dependence structure using copula functions. Furthermore, copula functions help us to recognize tail dependence. These parameters measure the degree of dependence between the random variables thanks to observing the extremes. The tail dependence coefficients represent the concentration on the upper and lower tails of the simultaneous distribution of two random variables X_1 and X_2 .

3.1.3. The upper (or lower) tail dependence coefficients. For given random variables X_1 and X_2 with marginal distributions F_1 and F_2 , The upper (or lower) tail dependence coefficients are defined as follows:

$$\lambda_U = \lim_{u \uparrow 1} P[X_2 > F_2^{-1}(u) | X_1 > F_1^{-1}(u)],$$

$$\lambda_L = \lim_{u \downarrow 0} P[X_2 \leq F_2^{-1}(u) | X_1 \leq F_1^{-1}(u)].$$

If λ_{ij} (respectively, λ_{li}) is positive, then two random variables X_1 and X_2 are asymptotically dependent at the upper tail (respectively, lower tail); if λ_{ij} (respectively, λ_{li}) is equal to 0, then two random variables X_1 and X_2 are asymptotically independent.

$$\lambda_U = \lim_{u \uparrow 1} \frac{1 - 2u + C(u, u)}{1 - u} \quad \lambda_L = \lim_{u \downarrow 0} \frac{C(u, u)}{u}$$

There are plenty of copula functions formed depending on the approach. For Student copula, let $t_v: \mathbb{R} \rightarrow \mathbb{R}$ be the Student density function with degrees of freedom:

$$t_v(x) = \int_{-\infty}^x \frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\sqrt{\pi\nu}\Gamma\left(\frac{\nu}{2}\right)} \left(1 + \frac{s^2}{\nu}\right)^{-\frac{\nu+1}{2}} ds, \quad (2)$$

where Γ is the Euler function. For correlation coefficient $\rho \in I$ and $t_{\rho, \nu}$ is the simultaneous distribution function of two random variables which are identically Student distributed:

$$t_{\rho, \nu}(x, y) = \int_{-\infty}^x \int_{-\infty}^y \frac{1}{2\pi\sqrt{1-\rho^2}} \left(1 + \frac{s^2 + t^2 - 2\rho st}{\nu(1-\rho^2)}\right)^{-\frac{\nu+2}{2}} ds dt. \quad (3)$$

A Student- t copula is defined as follows:

$$C_{\rho, \nu}^t(u, v) = \int_{-\infty}^{t_v^{-1}(u)} \int_{-\infty}^{t_v^{-1}(v)} \frac{1}{2\pi\sqrt{1-\rho^2}} \left(1 + \frac{s^2 + t^2 - 2\rho st}{\nu(1-\rho^2)} \right)^{-\frac{\nu+2}{2}} ds dt, \quad (4)$$

where ρ^{-1}_ν is the inverse function of 1-dimensional Student distribution function with ν degrees of freedom.

If marginal distribution functions F_1, F_2 are identically Student distributed with the same ν degrees of freedom and C is a copula Student-t with parameters ν and ρ then the two-variable distribution function F determined as in (4) is standardized 2-dimensional Student-t distributed, with $\mu=0$, correlation coefficient ρ and ν degrees of freedom. Parameters related to Student copula are shown in the following table:

Table 1: Copula Student and tail dependence coefficients

Copula	$C(u, v)$	λ_L	λ_U
Student-t	$t_{\nu, \rho} \left(t_v^{-1}(u), t_v^{-1}(v) \right)$, where $t_{\nu, \rho}$ is the two-variable Student-t distribution function with correlation coefficient ρ and ν degrees of freedom, and t_v^{-1} is the inverse of the function t_ν	$2t_{\nu+1} \left(-\sqrt{\frac{(v+1)(1-\rho)}{(1+\rho)}} \right)$	

Source: Adam et al. (2013).

In order to estimate the parameters of a copula function in a given family, three common methods are proposed, including exact maximum likelihood, inference function for margins and non-parameter kernel methods. In this paper, inference function for margins method is implemented.

3.2. Research data

Daily data was collected from November 23rd 2018 to March 24th 2021, including VNINDEX (as proxy of Vietnamese stock market), DOWJONES (as proxy of the USA stock market) and SHANGHAI (as proxy of Chinese stock market). The stock returns are calculated by the formulas:

$$rVNINDEX_t = \ln \left(\frac{VNINDEX_t}{VNINDEX_{t-1}} \right),$$

$$rSHANGHAI_t = \ln \left(\frac{SHANGHAI_t}{SHANGHAI_{t-1}} \right),$$

$$rDOWJONES_t = \ln \left(\frac{DOWJONES_t}{DOWJONES_{t-1}} \right).$$

For the purpose of investigating the change of the degree of dependence between the USA and the Vietnamese stock markets, between the Chinese and Vietnamese stock markets under the impact of the Covid-19 epidemic, the authors divide the data into two periods, from November 23rd 2018 to January 23rd 2020 and from January 23rd 2020 to March 24th 2021. Each period contains the same quantity of observations of 305. Note that, January 23rd 2020 was the time when Vietnam had the first Covid-19 confirmed case. The period of the selected data ensures an equal

number of observations of each period before and after a Covid-19 wave.

4. Empirical results and discussion

The following Table 2 presents the descriptive statistics of the three returns of rVNINDEX, rSHANGHAI, rDOWJONES in each period before and after January 23rd 2020.

The results in Table 2 show that the means of the returns are positive, revealing that the investment efficiency in the stock markets of Vietnam, China and the USA in the period before and after Covid-19 is still in bright. In the post-Covid-19 period, the mean of the Chinese stock market index decreases slightly, while the USA stock market index drops sharply. On the contrary, the mean of the return of the Vietnamese stock market index doubles. The Jarque-Bera statistic values are quite large, supporting the rejection of the null hypothesis that the

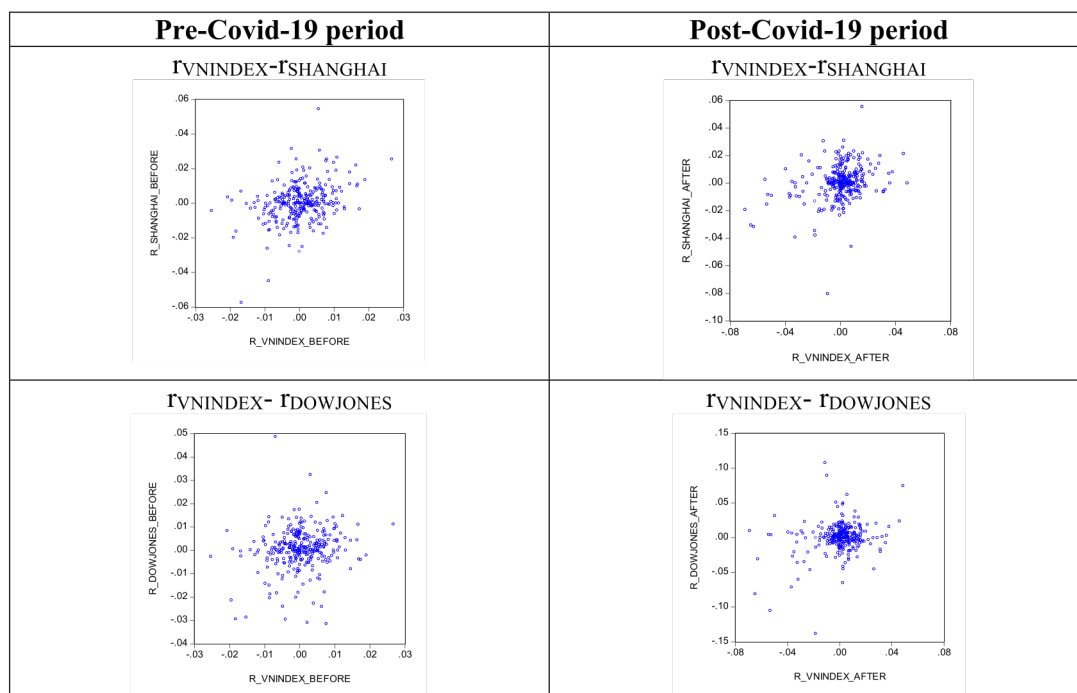
Table 2: Descriptive statistics of stock returns

	Pre-Covid-19 period			Post-Covid-19 period		
	$\Gamma_{vnindex}$	$\Gamma_{shanghai}$	$\Gamma_{dowjones}$	$\Gamma_{vnindex}$	$\Gamma_{shanghai}$	$\Gamma_{dowjones}$
Mean	0.00025	0.00047	0.00060	0.00052	0.00040	0.00034
Median	0	0	0.00072	0.00173	0	0.0011
Maximum	0.0266	0.0544	0.04864	0.0486	0.05554	0.1076
Minimum	-0.0253	-0.0574	-0.0314	-0.0690	-0.0803	-0.1384
Std. Dev.	0.0068	0.0108	0.0088	0.0154	0.01253	0.0215
Skewness	-0.1359	-0.1389	-0.2368	-1.2587	-0.9089	-0.8822
Kurtosis	4.4381	8.1635	7.7775	7.5614	9.9589	13.7695
Jarque-Bera	27.1333	338.7052	291.9523	343.8288	655.2638	1508.55
Probability	0.00001	0	0	0	0	0
Observations	305	305	305	305	305	305

Source: Authors

returns are normally distributed. Non-normally distributed returns are handled very efficiently thanks to the copula method.

Figure 1 includes scatter plots depicting the structure of dependence between the Vietnamese stock market return with, respectively, Chinese and the USA stock markets returns in each period.



Source: Authors

Figure 1: Scatter plots of two returns in each period

Based on the graphs in Figure 1, it can be predicted that the dependence structure between two returns is a symmetric dependent structure, so the Student copula is a suitable choice and there could exist a tail dependent structure. In addition, whilst dealing with time series, it is necessary to first check the stationarity of the returns. These results are presented in Table 3:

returns are still in the same direction, but the correlation level has decreased for each pair of returns. Additionally, with these parameters for the Student-t copula, we can describe the Student-t copula density function for the simultaneous distribution of each pair of returns as shown in Figure 2:

Finally, in order to estimate the probability that two stock markets increase or decrease simultane-

Table 3: The results of the stationarity test of the returns

Period	Returns	ADF test			Phillips-Perron test		
		Intercept	Trend and intercept	None	Intercept	Trend and intercept	None
Pre-Covid-19 period	RVNINDEX	-15.866*	-15.845*	-15.875*	-15.867*	-15.845*	-15.875*
	ISHANGHAI	-16.967*	-16.971*	-16.963*	-16.967*	-16.971*	-16.963*
	IDOWJONES	-17.234*	-17.216*	-17.197*	-17.235*	-17.227*	-17.196*
Post-Covid-19 period	RVNINDEX	-15.537*	-15.677*	-15.547*	-15.617*	-15.756*	-15.653*
	ISHANGHAI	-17.422*	-17.394*	-17.432*	-17.424*	-17.396*	-17.434*
	IDOWJONES	-5.8312*	-5.8967*	-5.8275*	-22.866*	-22.987*	-22.888*

Note : * denotes the significance level of 1%

Source: Authors

The results in Table 3 confirm that the stock returns in the period pre-Covid-19 and post-Covid-19 periods are station, and it is possible to move on to the next step to study the dependence structure between returns using the Student copula function. The parameters of the Student-t copula, including the correlation coefficient ρ and the number of degrees of freedom v . The results are as shown in Table 4:

The results in Table 4 show that under the impact of the Covid-19 pandemic, the correlations between

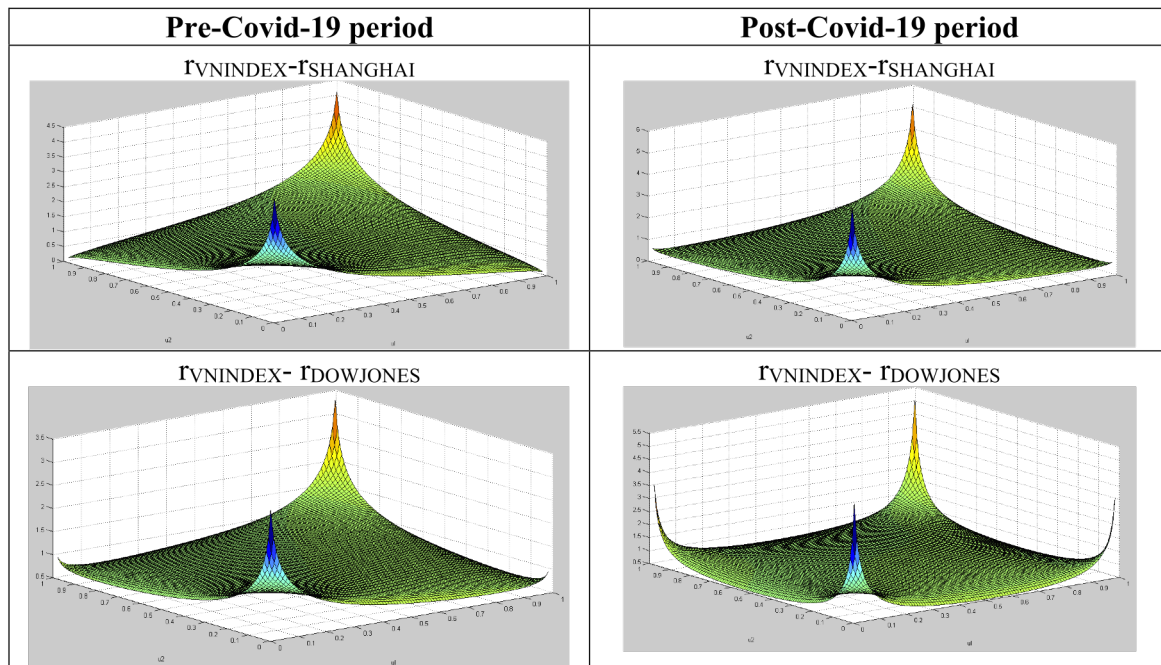
ously, the tail dependence coefficients between the two stock returns are helpful. According to the formulas in Table 1 with the fact in mind that the Student copula function is a symmetrized function, the upper and lower tail dependence coefficients are equal. The calculation results are presented as in Table 5 belows:

The tail dependence coefficients of the Vietnamese and the Chinese or the USA stock market indices in the pre-Covid-19 period are very low, showing the event that the two markets

Table 4: Estimation results of the Student's copula parameters

Pairs of returns	Pre-Covid-19 period		Post-Covid-19 period	
	Correlation coefficient ρ	Degrees of freedom v	Correlation coefficient ρ	Degrees of freedom v
RVNINDEX - ISHANGHAI	0.317288436	66	0.288828549	10
RVNINDEX- IDOWJONES	0.16265495	12	0.06830396	4

Source: Authors



Source: Authors

Figure 2: Student-t copula density function for the simultaneous distribution of each pair of returns

Table 5: Estimation results of tail dependence coefficients

Pairs of returns	Pre-Covid-19 period	Post-Covid-19 period
$r_{VNINDEX} - r_{SHANGHAI}$	1.34E-07	3.15E-02
$r_{VNINDEX} - r_{DOWJONES}$	9.00E-03	0.096429735

Source: Authors

explode or have the same crisis with a minor probability. However, in the post-Covid-19 period, the tail dependence coefficients between the stock returns on the Vietnamese market and the other two stock markets increase sharply to 3% and 9.6%, respectively, which confirm that the Covid-19 pandemic has greatly increased the dependence degree between Vietnam's stock market and the two leading stock markets in the world. These conclusions are relatively consistent with previous research by Boubaker and Salma (2011) studying the S&P500 stock index and 15 other stock indices in the period before and during the subprime debt crisis period 2008/2009 on the USA stock market. Similarly, Wang (2011) studied the period from

2006 to 2009, and showed that the Chinese stock market brought more risks of contagion to the Vietnamese market rather than the USA stock market. Remarkably, these effects were stronger after the crisis.

5. Recommendations

Research results show that the Covid-19 pandemic has greatly increased the dependence between Vietnam's stock market and the world's two leading stock markets. With such empirical evidence, several recommendations can be proposed for managers and investors.

5.1. Recommendations to managers

Firstly, the government should continue to implement policies to control the impact of the

Covid-19 pandemic. Research has confirmed that under the impact of this pandemic, the degree of dependence between the Vietnamese stock market and the USA and Chinese stock markets has increased. Therefore, when epidemics are controlled and prevented, spillover effects from dependence will be avoided. This desire is now also the expectation of not only Vietnam but the whole world. Since the impact of the Covid-19 pandemic has been present in all areas of the economy, life and society. In this situation, this study is also a demonstration of the impact of the pandemic on the economy, through the stock market.

Secondly, the research results show the increasing integration level of Vietnam stock market with the world and regional stock markets. This requires policy makers to properly recognize the role of market risk management and e-commerce risk management, especially during the pandemic. Policy makers can monitor crisis warning models on the USA and Chinese stock markets, in order to hedge risks or come up with appropriate policies before the crisis hits the Vietnamese stock market.

Thirdly, the empirical evidence reveals that Vietnam's stock market cannot avoid the impact of the USA and Chinese stock markets. Therefore, in order to prevent risks, policy makers should reform financial institutions on the stock market. Specially, in order to improve advanced risk management, the authorities should set up technical departments as well as monitor crisis warnings in the USA and Chinese markets and provide timely forecasts for Vietnamese stock market.

5.2. Recommendations to investors

Firstly, empirical results on the dependence structure between Vietnam's stock market and, respectively, the USA and Chinese stock markets provide helpful information for investors in diversifying their index portfolio on both world stock markets and domestic stock markets. Investors on the Vietnam stock market need not only pay attention to movements in the domestic market, but also to volatility in the USA and Chinese stock markets.

Information from these markets can be used as indicators to forecast investment efficiency of Vietnam stock market. Consequently, investors can diversify their index portfolio on the Vietnamese market and otherwise markets besides the two above-studied markets to spread risks.

Secondly, investors need to equip themselves with professional investment knowledge or combine with an expert advisor, to use measurement methods with scientific basis, to be proactive in risk hedging, and to avoid crowd psychology. Vietnam's stock market is still recognized an emerging market, so the risk will be higher than other markets. Hence, the impact on liquidity will be greater than that of other developing markets. Short-term and non-professional investors often react to shocks by selling off their holdings when the market declines, while professional investors look at the nature of the market and find out reasons to believe that, in the long term, the Vietnamese market will still grow, and the falling market will be an opportunity for investors to buy stocks at a cheap price. In order to grasp stock price ups and downs, a reliable information channel is to observe movements on the USA and Chinese stock markets.

6. Conclusions

The Covid-19 pandemic, which originated in Wuhan - China, began to spread on a large scale in late 2019 and early 2020. In the context that Vietnam is currently the leading trade partner with China and the USA, resonating with the USA-China trade war, Vietnam also has benefits and risks in this relationship. The study uses the copula method to assess the dependence structure between the Vietnamese stock market and the USA and Chinese stock markets during the Covid-19 pandemic. The research results confirm that, before the pandemic, the dependence degree of the Vietnamese stock market and the stock markets of China and the USA are low. However, the Covid-19 pandemic has greatly increased the dependence degree between the Vietnamese stock market and the two leading stock markets in the world.

This study has some limitations. First of all, Vietnam's stock market may also be affected by other stock markets in the region, such as Hong Kong, Singapore, and Japan, however, this issue has not been evaluated in this study. Secondly, the Covid-19 pandemic has affected many fields in the economy, trade and investment between Vietnam and the USA and China, unfortunately, this study only assesses the relationship in the stock market. ♦

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Summary

Trung Quốc và Mỹ hiện là những đối tác hàng đầu về thương mại, đầu tư của Việt Nam. Từ cuối năm 2019, đại dịch Covid-19 xuất phát từ Vũ Hán - Trung Quốc, lây lan trên diện rộng, có tác động lên thị trường chứng khoán (TTCK) Việt Nam, Trung Quốc và Mỹ, cũng như mối quan hệ giữa các thị trường này. Nghiên cứu sử dụng phương pháp Copula để nghiên cứu cấu trúc phụ thuộc giữa TTCK Việt Nam và TTCK Trung Quốc cũng như TTCK Mỹ trong đại dịch Covid-19. Kết quả nghiên cứu khẳng định rằng, trước đại dịch, sự phụ thuộc của TTCK Việt Nam với từng TTCK Trung Quốc và Mỹ là yếu, tuy nhiên, đại dịch Covid-19 đã khiến mức độ phụ thuộc giữa TTCK Việt Nam với hai TTCK hàng đầu thế giới đã tăng mạnh.

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