ISSN 2776-110X

Contents list are available at Journals.indexcopernicus.com

ASIAN Economic and Business Development

Journal homepage: aebd.tripleninecommunication.com

The Influence Of Technology And Government Policies On China's Supply Chain Activities

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Abstract

That kind of research seeks as for look into the influence connection between Trade, Tax Revenue, Hi-Technology Export in China.This study uses autoregressive vector modeling or VAR analysis which is utilized to establish the connection between each variable in the secondary data analysis in the period 2007-2020 in China. Consideration of data collection began in 2007 because in that year data related to technology in China began to exist. The data source comes from the world bank. We investigate Supply Chains, Government Fiscal Policy Strategies, and Technological Innovation. The government's fiscal policy strategy is indicated by the percentage of tax revenue % of GDP. The supply chain is represented by International trade % of GDP. Technology is indicated by High Technology Exports % of GDP. We found that Technological developments in China can affect the level of tax revenue from the country itself. Then again, using technology also has a significant relationship with the level of trade in China. That is, China's technological advances have a great influence on supply chain activities in China itself. The policies implemented by the Chinese government regarding supply chains are apparently influenced by technological developments, meaning that the more technology develops, the stronger government policies in carrying out economic activities.

Keyword : Supply Chain, Trade, Tax Revenue, Hi-Technology Export, Police

JEL Classification : C01, H52, H75

Received September 30, 2022; Revised October 11, 2022; Accepted October 20, 2022

DOI : 10.54204/AEBD/Vol5No1October2022006

Introduction

China's economy is one of the most developed in the world, and the country's manufacturing sector is one of the most important in the world (Sasongko, Bawono, & Prabowo, 2021). In 2018, the long-standing US "trade war", was China's rise to the top of the global trading system and the

dominance of its domestic economy (Chong & Li,2019). Tariffs, politics, and economic policies all play a part in the business's implementation, management, and strategic planning of supply chain management (SCM) activities, which are focused on digital transformation (Melkonyan, Krumme, Gruchmann, Spinler, Schumacher, & Bleischwitz, 2019).

At this time also development of industrial science and technology is growing. The developments in technology that occurs also make findings that can answer the challenges and problems that arise so that it will minimize the role of humans as operators (Angelopoulos, Michailidis, Nomikos, Trakadas, Hatziefremidis, Voliotis, & Zahariadis, 2019). There is no evidence that digitization of the supply sector is has a substantial effect on the supply industry economy, however, in a broader context, the digitization of business processes has the potential to create their respective competitive advantages over the supply economy and the organization's economy (Harsono & Kiswara, 2022).

Chain of supply seems to be a connection between a business the company's suppliers, terms of producing & distributing certain products to final buyers. This supply chain network includes several activities or activities, people, entities, information, and resources. The development of a company's supply chain can be interpreted that the company can cut expenses and continue to be successful in business it runs (Butt, 2021).

Technological developments from time to time have a significant impact on the economy (Widarni, Prestianawati, & Bawono, 2020). One of the impacts of the existence of technology can be seen from the supply chain activities in a company. Technology contributes in providing solutions to every problem the company faces in the supply chain process, from company management to financial performance (Achmad, Chaerani, & Perdana, 2021). However, it turns out that technology is not the only thing that affects the company's development in supply chain activities. Supply Chain Management or supply value planning also plays an important role in company activities (Orlando, Tortora, Pezzi, & Bitbol-Saba, 2022).

In the global supply chain/value chain, developing a complementary strategy for the right product is actually able to generate greater added value than just focusing on local resources (Clodoveo, Yangui, Fendri, Giordano, Crupi, & Corbo, 2021). This is what China is doing to be able to take a big part in the global supply chain (Cohen & Lee, 2020). Managing the supply chain a highly significant one of the commercial procedure. There is several various activities in just this chain that call for expertise and knowledge (Agrawal, Narain, & Ullah, 2019). When the supply chain is efficient, It may decrease the overall expenses and revenue of the increase revenues and profits. Any line in the stage is disrupted, this could can be costly and have an impact on the remainder of the chain (Yang, Wakefield, Lyu, Jayasuriya, Han, Yi, Yang, Amarasinghe, & Chen, 2020). The research aims as for investigate and to influence connection between Trade, Tax Income, Hi-Technology Export from the China.

Literature Review

A global supplier chain is an international system used in business to produce and distribute goods and services from one country to another. Using of one potential complication is the global supplier network a condition or situation that is expected to occur soon, but may also not occur) in the link between responsiveness and external integration methods that have an effect also

strengthening the manifestation of a country or company (Danese, Romano, & Formentini , 2013). In the face of competition and future crises, supply chains must continue to take advantage of technological developments. Technology is a common factor that contributes to providing solutions to any existing problems, including problems encountered in the supply chain. Technology is also important for a company or country that does international business (Achmad, Chaerani, & Perdana, 2021). Blockchain technology is a solution for business companies in the agricultural sector. This technology can support provide supply chain management systems that can provide information truthfulness in agricultural businesses (Khan, Malik, Konečná, Chofreh, Goni, & Klemeš, 2022).

State-of-the-art technology greatly influences the management of multinational companies of their worldwide value chains. It is technology changing the way these companies choose locations, choose specific governing frameworks, exchange information, manage networks for digital platforms, and overseeing people resources. We can expect this technology to become more important for multinational companies and Future changes to the composition of global value chains should be made (Ahi, Sinkovics, Shildibekov, Sinkovics, & Mehandjiev, 2021). Besides being able to affect company management, information technology also indirectly affects a company's financial performance through operational performance (Hutahayan, 2020). Maximizing investment in information technology can lead companies to profitability and have high effectiveness. This information technology can also be used to predict companies in the future (Marinagi, Trivellas, & Sakas, 2014).

In this globalization era technology is growing rapidly compared to other fields, this also affects global supply chains (Gereffi, 2020). Supply chain performance measurement is a measurement process that is carried out on every activity or indicator in the company's supply chain. Performance measurement is needed in a company because the results of the measurements taken can be used as feedback containing information about the success of achieving a target according to a predetermined plan. In addition, the measurement results can provide information on detailed indicators or performance activities that are below company standards and require improvement, so that companies can make adjustments and evaluations (Kazancoglu, Kazancoglu, & Sagnak, 2018).

Supply chain management is a product distribution concept that is able to produce a more optimal product distribution pattern (Ketchen Jr & Craighead, 2020). Saving supply chains as well as food safety requires this same proper communication a plan for fostering collaboration in order it produce food price availability , and distribution of food goes well (O'Hara & Toussaint, 2021). Several things that the government needs to pay attention to with relation to the policy of restricting during the COVID-19 epidemic, movement is ensuring that the chain of custody for food is secure and that the conditions for food production are at a safe level, which could really travel to remote places (Aday & Aday, 2020). Planning strategies regarding preparation for introducing logistics or supply chain advancements can enable businesses to prevent, discern, and react to unexpected supply chain problems or disruptions (Orlando, Tortora, Pezzi, & Bitbol-Saba, 2022).

The Covid-19 pandemic is an outbreak that provides a painful lesson to the people of Wuhan China and the outbreak is a new struggle to survive in the midst of the corona virus outbreak.

(Pudjiastuti & Hadi, 2020). Considering China as the supply chain of the global economy, which is the largest exporter in various countries. The outbreak of the corona virus is very disruptive to the supply chain in China (Qin, Liu, & Zhou, 2020). Supply chain activities cannot be avoided from the risk of disruption from various factors (Ojha, Ghadge, Tiwari, & Bititci, 2018). The weakening of the Chinese economy has an impact on economic growth with trading partners in various countries (Morrison, 2019). The main factor in supply chain vulnerabilities is the outbreak of the COVID-19 virus or commonly known as the corona virus (Ayomitunde, Abosede, Olubunmi, & Chidinma, 2020). To help restore the Chinese economy, it is necessary to create jobs where the aim is to create a strong food system and to restore the state of China (Zhang, Diao, Chen, Robinson, & Fan, 2020).

H1 = Planning strategy affects the supply chain

H2 = Technology affects the supply chain

Research Methods

This study uses autoregressive vector modeling or VAR analysis which is utilized to establish the connection between each variable in finally secondary data analysis as in period 2007-2020 in China. Consideration of data collection began in 2007 because in that year data related to technology in China began to exist. The data source comes from the world bank. We investigate Supply Chains, Government Fiscal Policy Strategies, and Technological Innovation. The government's fiscal policy strategy is indicated by the percentage of tax revenue % of GDP. The supply chain is represented by International trade % of GDP. Technology is indicated by High Technology Exports % of GDP. We use the following equation:

$$Tra_t = \beta_0 + \beta_1 Trev_t + \beta_2 Htx_{t2} + et \qquad \text{eql 1}$$

$$Trev_t = \beta_0 + \beta_1 Tra_t + \beta_2 Htx_{t2} + et \qquad \text{eql 2}$$

$$Htx_t = \beta_0 + \beta_1 Trev_t + \beta_2 Tra_{t2} + et \qquad \text{eql 4}$$

Where, Tra is International trade % of GDP, Trev is tax revenue % of GDP, Htx is High Technology Exports % of GDP.

Result And Discussion

Stationarity testing on the time series data above uses a root unit test which a test to establish the stationary nature of our time sequence data. The research utilised the Enhancing Fuller-Dickey for the normality tests. (ADF Test). Results of also tests include presented Figure 1 .

Table 1. Augmented Dickey-Fuller Test

Variabel	Unit Root	Statistic For The ADF	Probability	Deskripsi
Trade	2nd Difference	-7.271252	0.0002	Stasioner
Tax Revenue	2nd Difference	-3.974551	0.0160	Stasioner
Hi-Techology	2nd Difference	-5.902935	0.0012	Stasioner

Export				

The variables of Trade, Tax Revenue, and Hi-Technology Export data are stationary on the second difference. With the rate of probability of each is a variable smaller more than level of which is 0.05. From these results We will also continue with linear analysis. The next step in the analysis using VAR is determining the optimum lag. Determination of this optimum lag is determined by the data suggested by Hannan-Quinn with the smallest value (HQ), Schwarz Criterion (SC) Akaike Information Criterion (AIC), Final Prediction Error (FPE).

Table 2. Calculating The Optimal Lag

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-39.41713	NA	0.449367	7.712206	7.820723	7.643801
1	-26.03284	17.03455*	0.224480*	6.915062	7.349130	6.641444
2	-14.54403	8.355500	0.257424	6.462551*	7.222169*	5.983718*

Considering the outcomes of the optimum lag test on the desk above, It's possible that it's seen that almost all asterisks are in lag 2, so lag 2 is determined as the optimum lag used in all stages of further VAR analysis.

Table 3. VAR analysis

	D(HTE)	D(T)	D(TR)
D(HTE(-2))	-0.250931	-0.638972	0.019747
	(0.25318)	(0.71130)	(0.07092)
	[-0.99113]	[-0.89831]	[0.27843]
D(T(-2))	0.038794	-0.279293	-0.027704
	(0.07217)	(0.20276)	(0.02022)
	[0.53755]	[-1.37749]	[-1.37034]
D(TR(-2))	-1.481527	4.322619	-0.145729
	(1.09455)	(3.07514)	(0.30662)
	[-1.35356]	[1.40567]	[-0.47527]
C	-0.036985	-1.223804	-0.275801
	(0.31985)	(0.89863)	(0.08960)
	[-0.11563]	[-1.36186]	[-3.07806]
R-squared	0.404550	0.421582	0.298731
Adj. R-squared	0.149358	0.173689	-0.001812
Sum sq. resids	5.384377	42.50083	0.422545
S.E. equation	0.877039	2.464051	0.245690

F-statistic	1.585275	1.700659	0.993970
Log likelihood	-11.67916	-23.04228	2.318121
Akaike AIC	2.850756	4.916778	0.305796
Schwarz SC	2.995445	5.061467	0.450485
Dependent on mean	-0.059360	-0.963238	-0.201711
S.D. dependent	0.950923	2.710677	0.245468

From the table above, it can be seen that the relationship through HTE and HTE itself it substantially negative, containing an indicator that -0.250931 including the t-statistic -0.99113. This connection is HTE & T is also significant with a coefficient, minus worth as for -0.638972 a t-statistic, too value of -0.89831 this implies that the greater the HTE, the lower the T. Its connection of HTE, TR it essentially positive use a co - efficient value of 0.019747 including a t-statistic value 0.27843 it implies that higher and to HTE an larger it TR.

Furthermore, a connection with the variables T. Tit is substantially more than negative use an indicator value of -0.279293 a t-statistic too of -1.37749. This connection between T & HTE has been significant positive have used a coefficient value of 0.038794 than a t statistic so 0.53755, meaning that for greater T, any higher and HTE. The connection respectively T & TR ish negative specifically usean indicator value as for -0.279293 a t statistic, too of -1.37749, this implies that the higher T, the lower the TR.

This same connection between TR and TR is negative important with a coefficient value of -0.145729 and a t-statistic value of -0.47527. An relationship between TR and HTE is inconsequential because of coefficient value of -1.481527 is higher than the t-statistic value of -1.35356. Likewise, the relationship between TR and T is unimportant since the coefficient value is higher than the t-statistic value.

From the analysis above, it can be seen that a high level of export technology will encourage an increase in tax income from China. The greater the degree of trade, the higher the use of export technology. However, the higher the level of trade, the lower the tax income. Before conducting further analysis, It is essential to perform a VAR test for stability. This test is conducted by calculating and to roots the of polynomial function, the VAR model can be said to be if the value of the modulus is less than 1.

Table 4. VAR Stability Test

Root	Modulus
-0.360104 - 0.629742i	0.725431
-0.360104 + 0.629742i	0.725431
0.187513 - 0.640343i	0.667233
0.187513 + 0.640343i	0.667233
-0.544650	0.544650

Considering the outcomes of the VAR test for stability shown in the desk above, The conclusion that the estimated VAR to be used the fact that all absolute values (modulus) are less than 1. Using the Granger causality test a test used to establish the causal relationship between each variable in the study. In this study, it will be tested whether there is an influence between variables, namely the T, TR, and HTE . variables

Table 5. Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
T does Granger Cause not HTE	12	0.28509	0.7603
HTE does Granger Cause not T		7.67508	0.0172
TR does Granger Cause not HTE	12	2.88659	0.1218
HTE does Granger Cause not TR		0.29098	0.7562
TR does Granger Cause not T	12	6.50940	0.0253
T does not Granger Cause TR		0.44931	0.6553

The results of causality analysis with variables T, TR, and HTE show this same fact that significant link among both the HTE the variable as well as T factor andhere exists a two-way relationship which means that they influence each other. There is also a significant relationship in the TR and T variables and there is a two-way relationship, which means that each variable influences each other. With a probability value below the level, which is below 0.05.

Conclusion

Technological developments in China can affect the level of tax revenue from the country itself. Additionally, technological use also has a significant relationship with the level of trade in China. That is, China's technological advances have a great influence on supply chain activities in China itself. The policies implemented by the Chinese government regarding supply chains are apparently influenced by technological developments, meaning that the more technology develops, the stronger government policies in carrying out economic activities.

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