Research on the Hedging Relationship Between the Main Economic Indicators of China and RCEP Member States

Jiao Zhang*

Dalian Polytechnic University, Dalian 116034, Liaoning Province, China

Corresponding author: Jiao Zhang, sophie2013526@163.com

Abstract: In recent years, the bilateral economic and trade relations between China and other Regional Comprehensive Economic Partnership (RCEP) members have developed rapidly, laying a realistic foundation for economic interdependence. In order to comprehensively examine the mechanism of the interdependence of major economic indicators between China and RCEP member states, this paper uses the GAM model to select three main economic indicators of GDP, inflation, and exchange rate, and discusses the economic hedging relationship between China and RCEP member states. The study found that the economic hedging relationship between China and RCEP member states is mainly affected by trade volume, economic scale, and national strength.

Keywords: RCEP; Economy hedge; GDP; Inflation; Exchange rate

1. Introduction

In November 2020, China, Japan, South Korea, Australia, New Zealand and ten Association of Southeast Asian Nations (ASEAN) countries signed the largest free trade agreement in the world - the Regional Comprehensive Economic Partnership Agreement (RCEP). The economic ties between RCEP member states and China has been very close and growing closer in the 40 years since China's reform and opening up [1]. According to the United Nations Commodity Trade Database (UNCTAD), in 2021, the total bilateral trade between China and RCEP member states will reach US$1,867.4 billion, of which China's exports to RCEP member states will reach US$875.1 billion and imports will reach US$992.3 billion. With ASEAN surpassing the European Union to become China's largest trading partner, RCEP has undoubtedly become the regional economic organization that has the greatest influence on China.

Many scholars have conducted research on the economic hedging effect between countries, which can be divided into two categories according to the positive and negative effects of national economic shocks. Regarding the study of positive shocks, Bagnai [2] used the global macro-econometric model to examine the impact of a series of shocks on the Chinese economy on the rebalancing of global savings and demand. Arora and Vamvakidis [3] explored the short-term and long-term effects of China's economic growth on the economic growth of the rest of the world based on vector autoregressive and error correction models. Wang and Liu [4] studied the impact of China's economy on the world economy based on the panel individual fixed effect model. Research shows that China's economy has had a significant impact on the development of the world economy in both trade and direct investment.

2. Analysis model

2.1. Model building

Generalized additive models (GAMs) extend generalized linear models (GLMs) by replacing linear predictors with smooth functions of a set of explanatory variables [5]. In a GAM model, the response variable Y can follow any distribution of the exponential family, and the link function g can Y convert the response variable to a scale that is linear to the model. For the response variable Y, GAM can be expressed as follows:

$$g(E(Y)) = \alpha + \sum_{j=1}^{p} f_j(X_j)$$

(1)

where f_j is j the smooth function of $g(.)$ explanatory variable, α is the intercept, and X_j is the monotonic link function. By fitting smooth functions, GAM is more flexible than GLM because it allows non-linear relationships between the response variable and each explanatory variable. Smooth functions in GAMs are usually estimated by a spline defined by a curve consisting of piecewise polynomial functions connected at points called knots.

2.2. Variable selection

Gross domestic product (GDP) is a measure of the size of a country or region's economy. When China is economically hedged with other countries, GDP can reflect the size of trade and the intensity of economic activity between the two countries. The inflation rate is a measure of the economic health of a country or region. If a country has a higher inflation rate than another, it is likely to be at a trade disadvantage. The exchange rate is a measure of the exchange rate index of a country or region's currency against other countries' currencies. When China hedges its economy with other countries, the exchange rate affects the trade and investment relationship between the two countries.

Based on formula (1), China's GDP, CPI, and EX were selected as the response variables in turn, and the economic indicators corresponding to the RCEP member states, the import and export trade volume (Trade) between the two countries, and the global economic development level were selected. The Brent crude oil price index (CFD) was used as an explanatory variable, and the GAM model was used to study the hedging effect of the economic indicators of the RCEP member states on China. Thirdly, the GDP, CPI, and EX of the RCEP member states were selected as the response variables in turn, and the corresponding economic indicators of China, the import and export trade volume between the two countries, and the Brent crude oil price index (CFD) as an explanatory variable, where the GAM model was used to study the hedging effect of China on the main economic indicators of RCEP member states. The data from the first quarter of 2000 to the fourth quarter of 2021 were selected as samples, and all quarterly data came from the EIC database.

3. Empirical analysis

First, the GAM model is used to study the hedging effect of China on the main economic indicators of RCEP member states. The regression results are shown in **Table 1**.

Table 1 shows the F value of each explanatory variable. This value can judge the importance of each influencing factor on the response variable. The larger the value, the more important the factor. "***" represents the significance of < 0.01, "**" represents the significance of < 0.05, and "*" represents the significance < 0.1. The country codes of RCEP member states are as follows: Australia (AU), Cambodia (KH), Indonesia (ID), Japan (JPN), New Zealand (NZ), Singapore (SG), South Korea (KR), Thailand (THA), Vietnam (VIE), Philippines (PH), Laos (LA), Malaysia (MAS), Myanmar (MM), Brunei (BN).

Table 1. The regression results of China's hedging effect on the main economic indicators of RCEP member states

	GDP			CPI			EX		
	GDP	Trade	CFD	CPI	Trade	CFD	EX	Trade	CFD
AU	0.84	1.27	6.39***	59.56***	5.725***	3.315*	20.37***	15.61***	3.27**
KH	14.54***	1.14	5.48***	28.25***	3.02***	0.03	0.46	6.15 ***	1.41
ID	5.07***	5.95**	8.70***	85.25***	6.38***	2.02*	1.83*	10.09***	1.31
JPN	8.07***	2.21*	2.60**	70.46***	1.25	3.52***	13.17***	7.85***	2.23*
NZ	3.32***	7.89***	7.93***	20.40***	3.03**	10.82***	4.76***	16.53***	0.00
SG	29.27***	5.72***	2.39	27.48***	2.07	1.88	3.75***	5.62***	3.60***
KR	25.60***	40.11***	9.48***	69.24***	3.58***	13.82***	21.11***	5.63**	1.43
THA	3.42***	0.80	2.60**	31.47***	4.90***	8.72***	1.40	2.08*	4.37***
VIE	1.45	0.21	9.00***	98.34***	2.46**	2.68**	0.73	3.23**	31.16***
PH	16.85***	1.38	1.35	37.44***	5.36***	6.70***	6.93***	2.89**	4.54***
LA	23.41***	6.59***	7.08***	31.31***	16.35***	3.80*	2.06**	2.84**	5.53***
MAS	5.89***	1.42	8.62***	74.32***	3.84***	2.32	9.87***	12.00***	1.75
MM	1.35	3.10**	0.09	33.04***	7.54***	0.98	0.01	0.36	0.06
BN	3.64***	19.93***	0.75	21.67***	0.50	6.16***	3.02**	31.29***	3.70**

Next, the GAM model is used to study the hedging effects of RCEP member states on China's main economic indicators. The regression results are shown in **Table 2**.

Table 2. Regression results of RCEP member states' hedging effects on China's main economic indicators

	GDP			CPI			EX		
	GDP	Trade	CFD	CPI	Trade	CFD	EX	Trade	CFD
AU	0.02	9.30***	6.64***	71.79***	6.15***	3.40***	15.55***	2.47*	8.94***
KH	20.61***	1.52	1.31	32.77***	2.47*	0.93	0.21	0.02	2.77**
ID	4.60***	24.30***	3.19*	23.45***	7.86***	2.17*	5.85***	0.18	1.54
JPN	5.15***	35.88***	1.88	64.98***	7.96***	1.19	27.72***	1.37	1.51
NZ	4.12***	6.88***	24.77***	23.26***	3.23***	3.48***	8.58***	1.89	10.90***
SG	97.05***	20.24***	6.60***	22.15***	35.49***	8.76***	5.75***	0.02	2.96*
KR	13.21***	23.65***	18.12***	99.20***	2.63**	1.53	10.88***	2.98*	4.74***
THA	4.03***	9.51***	8.38***	13.87***	7.63***	2.88**	1.28	0.54	0.43
VIE	6.51***	1.48	7.42***	77.73***	2.34**	1.57	4.41***	0.42	2.50**
PH	27.03***	3.50*	2.98**	29.83***	6.78***	2.34	5.86***	8.17***	3.55***
LA	75.85***	10.73***	21.01***	35.61***	1.23	0.54	4.43***	4.58***	5.38***
MAS	7.63***	69.31***	1.80	71.08***	5.90***	10.39***	8.27***	3.04**	2.87**
MM	4.56***	0.71	3.39*	54.93***	5.39***	1.49	2.12*	2.26	2.43*
BN	0.80	8.83***	7.94***	6.30***	10.60***	3.08***	6.16***	1.80	3.94***

As shown in **Table 2**, China's main economic indicators have an impact on the corresponding economic indicators of most RCEP member states. Specifically, except for Australia, Vietnam, and Myanmar, China's GDP is significant to the GDP of the other RCEP member states at the 1% level, which indicates that China's economic development has a positive effect on the RCEP member states. Among

them, Singapore and South Korea are the most impacted. There are many funds from China in Singapore's investment field, and these funds have promoted Singapore's economic development. Due to its geographical proximity, China is one of South Korea's important trading partners, and South Korea exports a huge amount of goods and services to China.

From the perspective of exchange rates, compared with ASEAN countries, the hedging relationship between China and the more developed countries in the RCEP member states is more significant. This difference is mainly caused by the economic size and strength of the country. Japan, South Korea, Australia, and other countries have strong economies and trade scale, and their trade and investment relations with China have had an important impact on the RMB exchange rate and the exchange rate of their own currencies. When a country's exchange rate increases, the country's exports become more expensive, thus limiting the exports, while imports become cheaper, resulting in an increase in imports. This can lead to trade deficits in other countries, negatively affecting the economies of other countries.

4. Conclusion

RCEP is the largest free trade agreement between China and its surrounding areas, and its member states have close economic ties with China. The GAM model was applied in this paper, with three main economic indicators of GDP, inflation, and exchange rate, and the economic hedging relationship between China and the RCEP member states was explained. It was found that the development of China's economy boosted the RCEP members states to a certain extent and had the greatest impact on Singapore and South Korea. Except for Australia and Brunei, the GDP of RCEP member states had a significant impact on China's GDP. The hedging effect of the CPI index between China and RCEP member states was related to the bilateral trade volume. Compared with ASEAN countries, the hedging relationship between China and the more developed countries in the RCEP member states was more significant, and the economic size and strength of the countries led to the existence of this difference. According to the results of this research, the following conclusions are obtained:

(1) Strengthening transnational cooperation among RCEP member states
    With the deepening of the implementation of the RCEP agreement, governments and enterprises of RCEP member states need to actively promote transnational cooperation in order to make full use of the complementary advantages between countries and achieve mutual benefit and win-win results.

(2) Promoting regional trade diversification
    As the uncertainty of the global economy increases, countries need to strengthen trade diversification to reduce dependence on a single market. RCEP member states should carry out economic and trade activities according to local conditions, industrial structure, and comparative advantages of each country. By expanding the scope of the trade market and reducing excessive dependence on the trade volume of a certain country or region, trade risks are reduced.

(3) Pay attention to risk management
    RCEP member states should always pay attention to potential risks brought by other countries in the region, such as trade disputes, technological competition, and geopolitical risks. Actively respond to these risks to ensure the stability and security of economic cooperation relations.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhang Y, 2020, RCEP Regional Value Chain Reconstruction and China's Policy Choices—Based on the "Belt and Road" Construction. Asia Pacific Economy, 2020(5): 14–24 + 149.

[2] Bagnai A, 2009, The role of China in Global External Imbalances: Some Further Evidence. China Economic Review, 20(3): 508–526.

[3] Arora V, Vamvakidis A, 2011, China's Economic Growth: International Spillovers. China & World Economy, 19(5): 31–46.

[4] Wang X, Liu C, 2018, The Spillover Effect of China's Economic Growth - Are Trade and Investment Channels Important?. Economics and Management Research, 39(03): 16–25.

[5] Huang X, Shao T, Zhao J, et al., 2020, Analysis of Influencing Factors of O3 Concentration in Xi'an City Based on GAM Model. Environmental Science, 41(04): 1535–1543.