The Synchronization of Economic Policy Uncertainty among the G20 Countries

Dan Chen^{1,2}

¹School of Economics, Sichuan University, Chengdu, China
²Jincheng Collage, Sichuan University, Chengdu, China
Email: dannychan18@126.com

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Abstract: According to the CM synchronization index created by Cerqueira and Martins(2009), this paper measures the synchronization of economic policy uncertainty(EPU) among G20 countries. The results show that the synchronization of EPU among the developed countries is the highest, the synchronization of EPU between the developed and developing is lower, and the synchronization of EPU among the developing countries is the lowest; the EPU synchronization between America and the other developed countries is higher than that with the developing, while China goes the opposite way before 2011, but gets in line with the situation of America after 2011. In addition, the synchronization between America and China is high except when international events break out. Therefore this paper suggests that when major international events happen, all the countries should cooperate in policy-making so as to maintain the global EPU; the developed should live up to their responsibilities and do not make policies which harm the interest of the developing; and the developing should act positively to carry out policies, should cooperate with the developed to achieve a better situation in the global stage.

1. Introduction

With the strengthening of global economic integration, economic uncertainty has a strong transmission and infectious, it is not only a problem of a country, but also a common problem of a region or even the whole world. Then, whether the occurrence of a major event will lead to a certain degree of synergy in the economic policy uncertainty of various countries, and whether the response policies of various countries to the major event will produce similar economic uncertainty? Based on the above problems, the C-M synergy index constructed by Cerqueira and Martins (2009) measures the synergy degree of economic policy uncertainty among G20 countries, further quantifies the synergy of economic policy uncertainty in different countries, and lays a theoretical foundation for the formulation, implementation and cooperation of economic policies of various countries.

2. Measurement and Data Selection of Coordination Degree of Economic Policy Uncertainty

2.1 Measurement Method of Coordination Degree of Economic Policy Uncertainty

In this paper, we use the CM synchronization index proposed by Cerqueira & Martins (2009) [1] to measure the synergy degree of current economic policy uncertainty. The calculation formula is as follows:

$$Corr_{ij, t} = 1 - \frac{1}{2} \left(\frac{d_{it} - \overline{d}_i}{\sqrt{\frac{1}{T} \sum_{t=1}^{T} (d_{it} - \overline{d}_i)^2}} - \frac{d_{jt} - \overline{d}_j}{\sqrt{\frac{1}{T} \sum_{t=1}^{T} (d_{jt} - \overline{d}_j)^2}} \right)^2$$
(1)

Among them, $Corr_{ij, t}$ is the synergy index of country i and country j in t period, d_{it} and d_{jt}

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refer to the economic policy uncertainty index of country i and country j in t period, $\overline{d_i}$ and $\overline{d_j}$ refer to the mean values of economic policy uncertainty of country i and country j in the sample period, T is only the selected sample period.

2.2 Descriptive Statistics and Stationarity Test

In this paper, G20 countries are selected as the analysis samples, and the EU, Indonesia, South Africa, Turkey and Saudi Arabia are excluded under the premise of ensuring data integrity as far as possible. It can be seen from table 1 that during the period from January 2003 to December 2018, the average level of EPU index in Britain and France is the highest; the three countries with high fluctuation level (i.e. standard deviation) of EPU index are China, the United Kingdom and Mexico; among the sample countries, there are 7 countries with negative skewness, i.e. the right deviation of EPU index, which indicates that there are more sample values with EPU index greater than the average level during the sample period; and 5 countries in the sample The kurtosis of more than 3 indicates that the probability density distribution curve of EPU index in these countries is steep. Descriptive statistics are slightly different from the results of Zhang Xiyan and Chen Leyi (2019) [2]. The average level of the EPU index in the United Kingdom rises, while the skewness of the United States slightly changes. The ADF unit root test of each variable was carried out by Eviews, and the original sequence passed the ADF unit root stationarity test.

	Average	Std	Max	Min	Skewness	Kurtosis
USA	4.732797	0.374035	5.647796	3.801823	-0.018419	2.632885
CAN	4.925443	0.587686	6.108412	3.699823	-0.147377	2.032668
GER	4.818911	0.48479	6.118109	3.347585	-0.275933	2.998898
ITA	4.622299	0.359372	5.484872	3.456365	-0.375351	3.358534
UK	5.149095	0.697139	7.040357	3.416703	-0.046065	2.418008
FRA	5. 138422	0.539578	6.353732	3.421665	-0.47027	2.874483
JPN	4.596264	0.296527	5.467426	3.880135	0.295595	3.009915
KOR	4.806088	0.421072	5.970747	3.61917	0.149851	3.157655
AUS	4.468987	0.565021	5.820213	3.24501	0.083201	2.523013
BRA	4.920873	0.551997	6.517605	3.104421	0.049438	3. 427402
RUS	4.79997	0.563083	5.991506	3.182676	-0.264565	3.0017
IND	4. 403857	0.527558	5.647879	3.216466	0.104792	2.407675
CN	4.916981	0.710788	6.840878	3.263623	0.237746	2.658126
MEX	4.076465	0.595702	6.060817	2.141121	0.079007	4.264087

Table 1 Statistical Description Of Variables

3. Measurement and Analysis of Coordination Degree of Economic Policy Uncertainty

3.1 Analysis on the Coordination Degree of Epu Index in Developed Countries

Generally speaking, the larger the CM synchronization index, the higher the degree of coordination among countries. Using CM synchronization index to measure the synergy degree of sample countries from January 2003 to December 2018, it can be seen that G7 group has a high degree of synergy, almost all of which are above 0.5 (see Figure 1). In July 2017, due to the European refugee incident, about 85% of the refugees gathered in Italy, which caused great uncertainty in their economic policies, resulting in the coordination degree of developed countries in this period reduced to - 0.8; in 2007, due to the subprime crisis, the implementation and response time of economic policies of various countries to deal with the subprime crisis were different, resulting in relatively low degree of coordination, only 0.11 and 0.15; compared with 2010-20 During the 11 years of European debt crisis, the coordination degree of EPU index of developed countries is high, almost all above 0.8. It can be seen that for the sudden sub-prime crisis in 2007, countries did not come up with economic policies and measures in a concerted manner. As a result, at the beginning of the global financial crisis in 2008, each country introduced its own economic

policies to deal with the crisis. However, when the European debt crisis occurred in 2011, countries learned from the past and began to have more cooperation and cooperation in economic policies.





3.2 Analysis on the Synergy Degree of Epu Index in Developing Countries

Through calculation, the synergy index of developing countries is relatively small in the sample period (see Figure 2), almost all of which are below 0.5. Among them, from January to march of 2003, it was mainly affected by the Iraq war crisis, and Mexico, which had close trade relations with the United States, was most affected, resulting in the low degree of economic coordination of the whole developing countries during this period; in April 2007 and July 2008, mainly due to the impact of the subprime mortgage crisis and the global financial crisis, the attitude and coping strategies of developing countries to the crisis were different As a result, the coordination degree of economic policies is low; in October 2010 and November 2012, affected by the European debt crisis, the developed countries basically cooperate with each other to deal with each other, but the policy-making and cooperation degree of developing countries are still low at this time, resulting in the low degree of coordination among developing countries in this period; in September 2014, due to the impact of Isis terrorist attacks, Mexico's economic policy uncertainty is large As a result, the degree of synergy among developing countries decreased significantly during this period. It can be seen that the higher the degree of correlation between developing countries and small-scale emergencies, or the lower the response time and coordination degree of global emergencies, the lower the coordination degree of EPU index.



Fig.2 Epu Index Synergy among Developing Countries

3.3 Analysis on the Coordination Degree of Epu Index between Developed and Developing Countries

Through calculation, the synergy index between developed countries and developing countries is lower than that between developed countries, but higher than that between developing countries (see Figure 3). Thus, it can be seen that developed countries have certain influence on the economic policies of developing countries, and there is a certain economic policy spillover effect. In several major international events, such as the Iraq war crisis in 2003, the financial crisis in 2008, the European debt crisis in 2011-2012, and the brexit event in July 2017. During these major international events, the coordination degree of EPU index between developed and developing countries will be negative, about - 0.5.



Fig.3 Epu Index Synergy between Developed and Developing Countries

3.4 Analysis of Epu Synergy among Typical Countries

3.4.1 Epu Index Synergy between the United States and Other Countries

The synergy index between the United States and other developed countries is greater than that between the United States and developing countries. At the same time, the fluctuation range of the EPU index synergy index between the United States and other developed countries is small, while that of the United States and developing countries is large, especially when major international events occur, such as the Iraq war crisis in 2003, the subprime mortgage crisis in 2007, the global financial crisis in 2008, the European debt crisis in 2010-2011, and the Sino US trade war in 2018 The degree of synergy is negative, which indicates that the economic policies adopted by developing countries on major international events are not consistent with those of the United States.

3.4.2 The Synergy of Epu Index between China and Other Countries

Before 2011, there was no significant difference between China and other developing countries in EPU index synergy and between China and developed countries, but after 2011, the two showed obvious differentiation. The synergy degree of EPU index between China and other developing countries was relatively low and fluctuated violently, while that between China and developed countries was relatively high More stable. The reason for this heterogeneity may be that after 2011, China has assumed the responsibility of a big country. When the major crisis occurs, China will perform its own responsibility more actively and actively introduce various policies to cooperate with the treatment of major crisis by developed countries, while other developing countries are facing greater uncertain impact. Therefore, the synergy degree of EPU index between China and other developing and other developing countries is almost all below 0.5 after 2012, and there are many negative periods.

At the same time, the synergy degree of EPU index between China and developed countries is relatively high, but in 2007, 2011 and 2013, the synergy degree of EPU index with developed countries dropped below - 1, which corresponds to major events such as the subprime mortgage crisis and the European debt crisis. However, from the Perspective of CM index, there is one time point when the coordination degree of EPU index between China and developed countries decreases This shows that China's policy-making did not respond quickly in the face of these major international events, but only after the developed countries adopted certain economic policies did China make follow-up adjustment strategy.

3.4.3 The Synergy of Epu Index between China and the United States

The coordination degree of EPU index between China and the United States is relatively high, most of which are above 0.5. However, the volatility of the EPU index synergy degree of the two countries is relatively high. In some events that are only closely related to China and the United States, such as the beginning of the financial crisis in July 2007, the WikiLeaks incident of the U.S. Iraq war in July 2010, S & P's lowering of the long-term sovereign credit rating of the United States in August 2011, the prism gate incident in 2013, and The coordination degree of EPU index between China and the United States dropped to about - 1, showing a strong inconsistency. Especially when the financial crisis occurred in 2007, the coordination degree of EPU index of the two countries dropped to - 2.1, and the response time of economic policies and the implementation of policy adjustments between the two countries showed great differences. After being hit hard by the financial crisis, the two countries realized the importance of economic policy coordination to promote global economic recovery. During the European debt crisis period from 2010 to 2011, China and the United States showed strong consistency in economic policy formulation, and the EPU index synergy degree remained above 0.5.

4. Conclusion and Policy Recommendations

4.1 Conclusion of Epu Index Synergy Analysis

It is found that the coordination degree of EPU index in developed countries is relatively high, followed by developed countries and developing countries, and the lowest among developing countries. At the same time, the United States' economic policy has a high degree of synergy with other developed countries, that is, the United States' economic policy has a certain impact on other developed countries, while the EPU index synergy between the United States and developing countries is relatively low, because most developing countries adopt a wait-and-see attitude and follow-up policy towards major international changes. Before 2011, the synergy degree of EPU index between China and other developing countries is slightly higher than that of China and developed countries, which indicates that China has stronger influence in developing countries. After 2011, the synergy degree of EPU index between China and other developing countries has decreased and the volatility is large, which indicates that China's policy influence in the world has gradually increased, and the impact of its economic policy on countries around the world has been strengthened. Finally, the synergy degree of China US EPU index shows that the coordination degree of economic policies of the two countries fluctuates greatly. For emergencies, China's economic policy adjustment and implementation has a certain lag, which also belongs to wait-and-see and follow. However, after the financial crisis in 2008, China took on the responsibility of a world power and negotiated with other countries to formulate economic policies to promote the recovery and development of the world economy. In the European debt crisis from 2010 to 2011, China had a high degree of coordination with the EPU index of the United States.

4.2 Policy Recommendations

First, although different countries will face different economic policy uncertainties in different periods, when major international events occur, all countries should work together to formulate unified economic policies to promote the recovery and development of the world economy. Otherwise, it will be very easy to formulate a series of monetary and fiscal policies with their own interests as the starting point to increase the world economy. The uncertainty of economic policy hinders the development of world economy.

Second, the economic policies of developed countries have a great impact on the policy-making and implementation of developing countries. Therefore, in formulating economic policies, developed countries should take the responsibility of big countries, take the development and progress of the global economy as the starting point, prevent the occurrence of beggar thy neighbor events, which will damage the interests of developing countries and aggravate the failure of world economic policies Certainty.

Third, although developing countries have little influence on the formulation and implementation

of economic policies in developed countries, they should also actively respond to major and unexpected international events. China, as the world's second largest economy, should set an example for developing countries and actively voice on the global platform to seek greater influence on economic policies.

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