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Based on social network analysis: Whether international trade network changed before and after the outbreak of the COVID-19 pandemic?

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Abstract. Since the outbreak of COVID-19 pandemic, the international trade has been facing a severe impact. Based on the social network analysis method, this research models the world trade network during the six years from 2017 to 2022. The world trade network is made into a weighted directed adjacency matrix based on the data published by UN Comtrade database. The matrix also refers to the gravity model. With visualized data and images, this research makes a quantitative study on the impact of the COVID-19 pandemic on the world trade network from the perspective of network analysis, centrality analysis and clustering coefficient. Apart from that, this research focuses on the international trade pattern and how it changes under the impact of the pandemic. According to this research, although the world trade network has not been deeply affected by the disease, there are some concealed tendency has been discovered, which may profoundly change the world pattern in the future.

Keywords: Social Network Analysis, International Trade Network, COVID-19, Centrality Analysis.

1. Introduction

The pandemic has the potential to impact on international trade networks[1]. Before the pandemic, the network showed a close connection and interdependence between regions and countries. However, after the outbreak, as countries adopted different prevention and control measures, such as limiting carriage of goods and closure of borders[2], it is likely to be caught in a trap that weakens the contact of the network in the partial or global region.

First, international trade networks may have structural changes during the pandemic[3]. Due to the outbreak of mobility restrictions and disrupted traffic, some key nodes in a network dropped the trade or trade fell sharply[1].

In addition, the outbreak also speeded up the process of regionalization of global supply chains: countries began to pay more attention to local production and the stability of the supply chain, so there are more local and regional trade[3]. This trend is likely to continue after the pandemic and further drive the restructuring and optimization of global supply chains.

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In terms of trade policy, during the outbreak some countries adopted protectionist measures, such as increasing tariffs, restricting imports and so on. These measures have negatively affected global trade networks, leading to reductions and slowdowns in international trade activities[4]. These measures may lead to a weakening of the connectivity of international trade networks, while also causing controversy and reflection on trade liberalization.

Overall, the epidemic may profoundly influence the international trade networks, including its structure and policy. In the future, with the global epidemic under control and economic recovery, the international trade network is expected to gradually recover and show a more stable, diversified and sustainable development trend again[5].

This research is mainly based on social network analysis (SNA). It analyses the international trade data for 6 years, from 2017 to 2022. The first three years of this period are before the outbreak of the epidemic, and the last three years are after that. So that is why the data has a reasonable explanation for the impact of the epidemic on international trade networks. It is important to note that post-pandemic global trade data will be fluctuant over time, while other changes will also be possible in the future.

2. Data and Models

2.1. Network Modeling

In the network of international trade, countries are represented by nodes and trade relations between countries are represented by directed links connecting nodes. The trade data used in the study covers 188 countries or regions, a time span of 6 years (2017-2022). All data were obtained from the UN Comtrade Database. UN Comtrade is an international trade data and analysis platform that provides trade data and related statistical analysis on a global scale. This platform can be used to find the trade between different countries and regions, including all kinds of goods import and export data, trading partners, etc. In this database, exporting and importing countries often report slightly different numbers due to discrepancies in national reporting standard[6]. For example, the amount of export that the United States reported to China in 2022 was $154 billion, slightly different from the amount that China reported to import from the United States, which was $179 billion. In these cases, this research takes the arithmetic average of the two reported numbers.

To build the model of the network, this research creates a weighted directed adjacency matrix based on bilateral trade data with MATLAB. The matrix, $\boldsymbol{w}(i, j, t)$, represents the dollar value of exports from country $\boldsymbol{i}$ to country $\boldsymbol{j}$ in year $\boldsymbol{t}$[6]. The self-cycle of each node is defined as 0. It contains the direction and strength of trade relations. The resulting network is a complete network of international trade. This research also makes it visualized with a tool called Flourish, which is shown in figure 1.

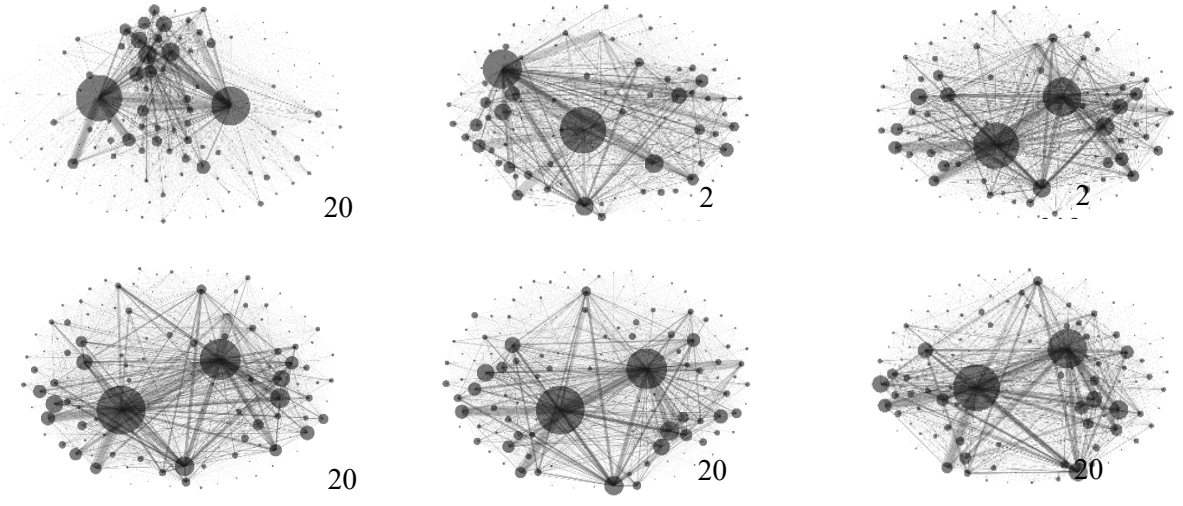

Figure 1. The international trade network from 2017 to 2022.

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This research constructs six matrices, representing each selected year. Columns and rows are composed of 188 countries, any each cell contains the dollar volume of trade between a pair of nations. The rows stand for the export, and columns represent import[7].

Apart from that, this research sets two cut-off values on trade data for the network analysis, $1 million and $10 million[8]. The reason for this is the world trade network is very large. Setting the cut-off value can help us figure out the more important trade relations and the most representative features. For example, if country A to country B exports commodity value less than $1 million (or 10 million) dollars, the A and B connection does not exist. The boundaries of $1 million is likely to be a loose definition of trade relations, and the limits of $10 million is a strict definition[8].

2.2. Gravity Model

The gravity model is the most commonly used international trade model to explain the modern global economy[9]. It is considered a standard vehicle for international trade analysis, for its highly successful use in empirical model for predicting bilateral trade flows. The gravity model is an econometric model, reminiscent of Newton's law of gravitation[10]. The volume of trade between two countries is positively related to the size of their economies (usually measured by GDP) and negatively related to their distance[9].

$$\omega_{i,j} = \alpha \frac{GDP_i GDP_j}{d_{i,j}}$$

Figure 2. Gravity model based on GDP in 2022.

The gravity model is also affected by many other factors[10][11]. However, in order to simplify the model, only the most important factors are under consideration. This research makes a visualized gravity model in figure 2. It is obvious that the main nodes in the model correspond to the real global trade network. Quantitatively speaking, the gravity model is suitable for trade network prediction.

3. Network Analysis

3.1. Degree Analysis

By analysing the global trade network, this research obtains the following two tables at the cut-off value of $1 million and $10 million. Through the analysis of statistics, this research describes the features of the mean degree, the variance, the minimum and maximum value of the in-degree and out-degree, the network density and geodesic distance[8][12].

Table 1 and table 2 show that, regardless of the cut-off value of $1 million or $10 million, the number of effective links and the average degree in the global trade network remained roughly stable from 2017 to 2021, and as this research expected, the number of connections and the average degree declined slightly in early 2020 and rebounded somewhat in 2021. The data for 2022 were relatively volatile. When this research conducts the cut-off value from $1 million to $10 million, both the number of connections and the average degree are significantly reduced.

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In addition, export relations always have more heterogeneity than import relations. This is reflected in the fact that the variance of the row sum is always lower than that of the column sum[8].

Table 1. Characteristic of World Trade Networks when $1 Million.

$1 Million cut-off		Year					
Measure		2017	2018	2019	2020	2021	2022
Links							
		15531	15615	15574	15211	15246	13979
Mean							
		82.61	83.06	82.84	80.91	81.10	74.36
Variance							
	Indegree	1538.72	1512.66	1511.17	1499.73	1590.09	1638.72
	Outdegree	3074.95	3148.30	3179.60	3213.98	3187.68	3034.39
Minimum							
	Indegree	9	10	9	8	5	6
	Outdegree	2	3	3	2	1	3
Maximum							
	Indegree	180	179	183	178	180	181
	Outdegree	187	187	187	187	186	186
Density							
		0.442	0.444	0.443	0.433	0.437	0.398
Geodesic distance							
		1.550	1.548	1.549	1.559	1.558	1.594

Table 2. Characteristic of World Trade Networks when $10 Million.

$10 Million cut-off		Year					
Measure		2017	2018	2019	2020	2021	2022
Links							
		10344	10458	10394	10120	10415	9779
Mean							
		55.02	55.63	55.29	53.83	55.40	52.02
Variance							
	Indegree	1335.03	1322.06	1324.52	1308.95	1376.11	1372.73
	Outdegree	2430.57	2480.83	2464.04	2424.91	2476.50	2309.60
Minimum							
	Indegree	2	2	2	2	1	1
	Outdegree	0	0	0	0	0	0
Maximum							
	Indegree	163	162	165	159	160	161
	Outdegree	183	186	183	185	185	186
Density							
		0.294	0.297	0.296	0.288	0.296	0.278
Geodesic distance							
		1.706	1.702	1.704	1.715	1.695	1.717

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As expected, with the increase in average connection number, the network density in the three years preceding the outbreak remained fairly stable, whether $1 million or $10 million. In 2020, there was a slight decline in network density. Although there was a little rebound in 2021, a more significant decline still happened in 2022.

Density reflects the degree of cohesion in a network. That is, the denser a network is, the more cohesive it is[8]. Therefore, outbreak of the pandemic brought some negative impact to the global trade network cohesion.

As a whole, the world trade network remained relatively stable during the pandemic, while there were a series of fluctuations in its aftermath. Rosenau argues that the world is so extensively interconnected that any event can give rise to a restless commotion, which reverberates in fast-paced and unexpected ways throughout the environment and its diverse systems[8][13]. The geodesic distance, however, captures the variation in reverberation velocity.

The geodesic distance between two nodes is connected to the length of the shortest path, a path that contains the length of the arc[14]. As shown in Table.1 and Table.2, geodesic distance before the outbreak remained stable, but after the outbreak there was an overall trend of getting farther, as well as a certain fluctuation. At a cut-off value of $1 million, the average distance between two mutually accessible countries was 1.549 in 2020 compared to 1.594 in 2022. In other words, the pandemic has made the average distance between two countries to trade longer, which means that the fluidity of world trade is gradually declining. The trend toward globalization is also showing signs of shrinking toward regionalization.

3.2. Centrality Analysis

Centrality measures are often used to understand whether the connectivity in a network is uniformly distributed. This evaluation can be performed either on individual network nodes by the various centrality measures that have been developed, or on the entire network by the concentration index[9]. In network analysis, the centrality of a node is directly related to its connectivity with the rest of the system and is interpreted as a measure of its importance in the structure of the network. In general, if a central node is disconnected from the network, the entire network structure will be affected. If a shock hits a central node, the propagation will be wide and fast. In the international trade network, centrality measures based on the number of trade links in a given country and their strength indicate the extent to which a country is linked to the rest of the system and the extent to which the location of the country shapes the network. The centrality metric that is used in this work attempts to assess the influence of a country on the international trading system as a whole and on a particular region. Within a given region, the structure and level of cohesion of the region depend critically on the central country. Through analysing the centrality over time during 2017 to 2022, this research works on figuring out how the international trade network changes before and after the pandemic.

Table 3. Total degree centrality.

2017		2018		2019	
China	100.00	China	100.00	China	100.00
France	100.00	France	100.00	Germany	100.00
Spain	100.00	Germany	100.00	Spain	100.00
Thailand	100.00	Netherlands	100.00	Sweden	100.00
United Kingdom	100.00	South Africa	100.00	Thailand	100.00
Poland	99.73	Spain	100.00	Indonesia	99.73
Singapore	99.73	Thailand	100.00	Netherlands	99.73
Germany	99.47	United Kingdom	100.00	South Africa	99.73
Indonesia	99.47	USA	99.73	United Kingdom	99.73
Rep. of Korea	99.47	Czechia	99.47	Brazil	99.47

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Table 3. (continued)

2020		2021		2022	
China	100.00	China	100.00	China	100.00
Spain	100.00	Italy	100.00	Spain	100.00
Thailand	100.00	Thailand	100.00	United Kingdom	100.00
United Arab Emirates	100.00	United Arab Emirates	100.00	Netherlands	99.73
Indonesia	99.73	Belgium	99.73	Poland	99.73
Poland	99.73	Spain	99.73	South Africa	99.73
United Kingdom	99.73	Sweden	99.73	USA	99.73
France	99.47	Austria	99.47	Belgium	99.47
Rep. of Korea	99.47	France	99.47	France	99.47
Singapore	99.47	Rep. of Korea	99.47	Germany	99.47

The first measure is total degree centrality and is shown in Table.3. The degree of a node is the number of links connected to the node, and is defined in terms of the adjacency matrix. The total degree centrality of a node is the sum of the relative in-degree centrality and out-degree centrality[9][14].

$$D_i = \sum_{j=0}^{n} a_{ij} + a_{ji}$$

It is simply according to the number of existing connections to measure a country's degree of contact with other parts of the system[15]. As expected, the linkages between large and advanced economies are very strong. It is interesting to note that using this without considering the first trade flows weight index, European and Asian countries seem to perform better than the United States. In fact, the United States is relatively not so open as other advanced countries[9]. In this method of measurement, the BRIC countries seems to be active in the network. Except for Russia Fed., other BRICS countries usually rank in the front, while China always ranks first whether before or after the outbreak of the pandemic.

Table 4. Total weight centrality.

2017		2018		2019	
China	100.00	China	100.00	China	100.00
USA	96.81	USA	94.57	USA	94.55
Germany	63.61	Germany	62.48	Germany	60.84
Japan	33.20	Japan	32.38	Japan	31.68
France	28.92	France	28.24	France	28.10
United Kingdom	26.72	United Kingdom	25.72	United Kingdom	25.96
Rep. of Korea	26.17	Netherlands	25.50	Netherlands	25.09
Netherlands	25.21	Rep. of Korea	25.34	Rep. of Korea	23.90
Italy	24.35	Italy	24.09	Italy	23.58
China, Hong Kong	22.61	China, Hong Kong	21.47	Canada	21.22
2020		2021		2022	
China	100.00	China	100.00	China	100.00
USA	86.57	USA	82.19	USA	88.78
Germany	57.34	Germany	53.23	Germany	52.20
Japan	28.26	Japan	26.02	Japan	26.33
France	24.80	France	23.19	Netherlands	24.15

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Table 4. (continued)

Netherlands	23.73	Netherlands	23.19	France	23.77
United Kingdom	23.12	Rep. of Korea	22.39	Rep. of Korea	23.44
Rep. of Korea	22.55	Italy	20.91	Italy	22.92
Italy	21.45	United Kingdom	20.04	United Kingdom	20.89
China, Hong Kong	19.86	China, Hong Kong	18.77	India	19.56

In table 4 the measure is total weight centrality. In the weighted network, this research defines the number and weights of the link incident in a node as the weight centrality. The total weight centrality of a node is the sum of the relative in-degree centrality and out-degree centrality[9][14].

$$W_i = \sum_{j=0}^{n} w_{ij} + w_{ji}$$

Total weight centrality may be more persuasive than simple total degree centrality in a weighted network. It concerns the trade volume of each country, rather than on the numbers of trading partners. The outbreak of the virus did not bring too much change to the ranking of the total weight centrality. The top four are China, the United States, Germany and Japan, and there are no changes in the 6 years. Besides, Britain, Italy, South Korea, Netherlands and Hong Kong are also active economies in the international trade network with large throughput. It is worth noting that before the outbreak, the gap between China and the US was not big, at about 5%, and it expanded by close to 15% after the outbreak. In 2022, India came into the top 10 for the first time, and the gap between China and other developed economies became further away. It is reasonable to speculate that advanced economies have been relatively more affected by the pandemic events than developing economies.

Eigenvector centrality considers the importance of the trade partners[9][14]. In this measure, $\boldsymbol{\gamma_i}$ as the centrality of a node $\boldsymbol{i}$ and it depends somehow on $\boldsymbol{\gamma_j}$ if $\boldsymbol{j}$ is a neighbor of $\boldsymbol{i}$ and its importance is transmitted through the network structure.

The eigenvector centrality will be stable after iteration. This measure depends on how important their trade partners are. Eigenvector centrality is more suitable for the research on the most influential nodes in a network. According to the data in table 5, the first and second most influential countries in the network are the United States and China. These two countries rank quite stable and they actually have much more influence than other countries. As a result, Mexico and Canada, which do a lot of trade with the United States, also seem to rank higher. Germany is the most influential country in Europe, followed by Britain, France and Netherlands. In Asia, Japan, South Korea, and Hong Kong are more influential economies.

Table 5. Eigenvector Centrality

2017		2018		2019	
USA	100.00	USA	100.00	USA	100.00
China	91.03	China	91.62	China	88.80
Canada	45.92	Canada	45.40	Mexico	47.12
Mexico	44.52	Mexico	45.33	Canada	46.93
Germany	44.34	Germany	44.91	Germany	46.45
Japan	42.83	Japan	42.65	Japan	42.89
China, Hong Kong	35.91	China, Hong Kong	35.28	China, Hong Kong	33.38
Rep. of Korea	32.89	Rep. of Korea	33.53	Rep. of Korea	32.65
United Kingdom	24.01	United Kingdom	24.01	United Kingdom	25.93
France	22.44	France	22.67	France	23.98

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Table 5. (continued)

2020		2021		2022	
USA	100.00	USA	100.00	USA	100.00
China	97.07	China	99.10	China	89.23
Germany	47.98	Germany	45.88	Canada	48.29
Mexico	43.87	Mexico	44.17	Mexico	46.62
Japan	43.57	Canada	43.97	Germany	42.85
Canada	43.09	Japan	41.44	Japan	36.67
China, Hong Kong	36.81	China, Hong Kong	37.86	Rep. of Korea	33.36
Rep. of Korea	35.15	Rep. of Korea	36.32	China, Hong Kong	28.05
United Kingdom	25.08	Viet Nam	24.93	Viet Nam	22.73
Netherlands	23.24	Netherlands	22.97	Netherlands	22.53

In addition, the influence of Vietnam is increasing after the pandemic. It is noticeable that after the outbreak of COVID-19, the gap between China and the United States became narrow, even less than 1% in 2021. However, in other parts, despite little fluctuations, there are no big changes. In addition, after the outbreak, the gap between Mexico, Canada and the United States also narrowed; this may be caused by the two countries trying to trade more with the United States, which is contiguous to them. Because of that, the influence of the eigenvector has some improvement in the evaluation system. This phenomenon implies that some economies try to strengthen the progress of regionalization again declining tendency in order to deal with the economic dilemma.

To deal with the deviation, other measures are supposed to be considered. Hyperlink-Induced Topic Search (HITS) is an algorithm to rank the quality of nodes in a network[16]. It is divided into two types: Hub and Authority. The hub refers to those nodes that contain many links to the authority nodes, and authority pages are those that contain substantial content so they are always important themselves. The purpose of the HITS algorithm is to return rank the high-quality authority node[16]. The HITS algorithm is based on two assumptions: a high quality authority node will be pointed to by many high quality hub nodes, and a high-quality hub node will point to many high-quality authority nodes[9][14]. The hub value is equal to the sum of the authority values of all the nodes it points to and authority value is equal to the sum of the hub values of all nodes pointing to it.

$$H_i = \alpha \sum_{j=0}^{n} a_{ji} y_j$$

$$A_i = \beta \sum_{j=0}^{n} a_{ij} x_j$$

Table 6. Hub centrality.

2017		2018		2019	
USA	100.00	USA	100.00	USA	100.00
China, Hong Kong	41.90	China, Hong Kong	41.14	China, Hong Kong	41.10
China	40.51	China	40.33	China	40.00
Germany	31.39	Germany	31.78	Germany	33.66
Japan	30.54	Japan	30.59	Japan	32.29
Canada	28.04	Mexico	27.72	Mexico	29.33
Mexico	27.24	Canada	27.43	Canada	29.30
United Kingdom	25.04	United Kingdom	24.05	United Kingdom	26.46
Rep. of Korea	22.27	Rep. of Korea	22.32	Rep. of Korea	23.93
France	22.17	France	21.78	France	22.95

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Table 6. (continued)

2020		2021		2022	
USA	100.00	USA	100.00	USA	100.00
China, Hong Kong	41.25	China, Hong Kong	43.17	China	37.83
China	40.09	China	40.12	Germany	35.43
Germany	33.86	Germany	33.82	China, Hong Kong	34.61
Japan	31.04	Japan	29.60	Mexico	30.23
United Kingdom	25.59	Mexico	26.30	Japan	29.88
Canada	25.55	Rep. of Korea	25.28	Canada	28.34
Mexico	24.18	Canada	24.74	Rep. of Korea	26.39
Rep. of Korea	24.03	United Kingdom	22.77	United Kingdom	23.65
Netherlands	22.08	Netherlands	22.49	Netherlands	23.50

Table 7. Authority centrality

2017		2018		2019	
China	100.00	China	100.00	China	100.00
USA	41.90	USA	41.14	USA	41.10
Germany	40.51	Germany	40.33	Germany	40.00
Japan	31.39	Japan	31.78	Japan	33.66
Rep. of Korea	30.54	Rep. of Korea	30.59	France	32.29
France	28.04	France	27.72	Rep. of Korea	29.33
Italy	27.24	Italy	27.43	Italy	29.30
Netherlands	25.04	Netherlands	24.05	Netherlands	26.46
Canada	22.27	Mexico	22.32	Mexico	23.93
Mexico	22.17	United Kingdom	21.78	Canada	22.95
2020		2021		2022	
China	100.00	China	100.00	China	100.00
USA	41.25	USA	43.17	USA	37.83
Germany	40.09	Germany	40.12	Germany	35.43
Japan	33.86	Japan	33.82	Japan	34.61
Rep. of Korea	31.04	Rep. of Korea	29.60	Rep. of Korea	30.23
Netherlands	25.59	Netherlands	26.30	Netherlands	29.88
Italy	25.55	Italy	25.28	Italy	28.34
France	24.18	France	24.74	Canada	26.39
Mexico	24.03	Canada	22.77	France	23.65
Canada	22.08	Mexico	22.49	Mexico	23.50

Table 6 and table 7 shows the Hub centrality and Authority centrality rank of the international trade network. Hub centrality is more concerned with the hub of nodes. When a country is connected with more important nodes in the network, it would be considered an important hub. The United States has been the most important hub of international trade in the network, and is far more important than other countries. Hong Kong, China, Germany, Japan and other countries are also very important regional hub and they are also strong economies themselves. It is worth noting that Hong Kong has experienced a relatively sharp decline of nearly 10 percentage in 2022 compared with 2021. Up to 2021, Hong Kong has been one of the most important trade hubs in the world, second to the United States, which also

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shows that Hong Kong's hub position in the trade network has been seriously affected during the pandemic.

In the Authority centrality table, China always ranks at the top, far ahead of other countries, and the gap with other countries further widens after the epidemic, indicating that China's position in the trade network is relatively stable and has not been greatly affected by the epidemic. The authority of most other countries also remains stable, and the ranking is roughly similar to the total weight centrality.

Through centrality analysis, it is evident that the global economic and trade pattern has not changed greatly, but there has been some imperceptible appearance which may be a good signal to the future trend.

Some economies continue to maintain a stable position, such as China and the United States, the world's most important trade node, and nobody can shake their status. Moreover, some of the economies in this period of time have dug out opportunities, such as India, Vietnam and other developing countries; maybe with the advantages of their own manufacturing, they have found a solution for themselves. However, some countries are facing a dilemma; for example, the decline in all aspects of the United Kingdom is obvious, which is not necessarily completely related to the epidemic, but is more likely to be affected by Brexit in 2020. Besides, the descent of Hong Kong's status is also noteworthy. As an important trade hub in Asia, Hong Kong may probably be anxious getting back to where it belongs.

3.3. Hierarchical structure of network

The clustering coefficient of a country is the probability of the existence of trade-based relationships among the countries connected to the node in the network. It reflects the close relationship between countries. The clustering coefficient of a country is high if its neighbors are close. Conversely, if a country has loose neighbors, its clustering coefficient will be low. Countries with higher clustering coefficients have a greater impact on the network[7], because the better the connections between countries, the faster the influence spreads.

This research visualized the clustering coefficients of each node in the trade network with its in-degree and out-degree in Fig.3 and Fig.4. The abscissa is the value of indegree or outdegree and the ordinate is the value of the clustering coefficient.

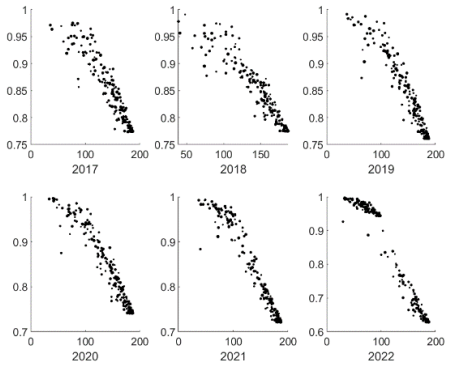

Figure 3. Indegree-clustering coefficient scatter plot.

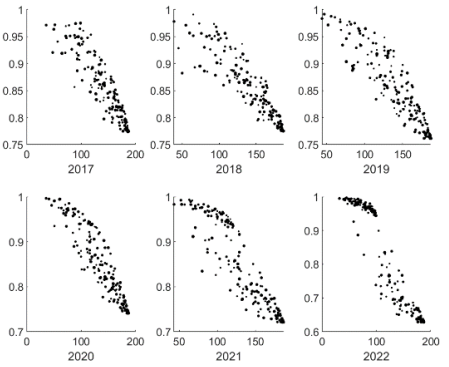

Figure 4. Outdegree-clustering coefficient scatter plot.

The hierarchical structure of the network is more ordered due to similar roles having similar effects. In both import-based and export-based networks, the points before the epidemic are scattered, indicating that the hierarchical structure of the network is not so clear. After the outbreak especially in 2022, however, these points tend to be concentrated gradually, which means that the network evolved into a clearer hierarchy. In addition, it is visible that the in-degree figure is more concentrated than the out-degree figure[7]. It illustrates that the hierarchy of the import-based network is more ordered than that of the export-based network.

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4. Conclusion

Although the COVID-19 outbreak had a great influence on the lives of people and trade volume, little impact is observed on the relative international trade pattern at the present stage from the perspective of social network analysis. In spite of this, it is still necessary to figure out the trend of globalization and regionalization in the network. This research constructs a weighted directed adjacency matrix based on six years of trade data and performs network analysis and centrality analysis using social network analysis method (SNA) to conduct a detailed analysis of the international trade network from 2017 to 2022.

Above all, it is obvious that under the current world pattern, the two most important countries in the trade network are China and the United States. From the weight centrality, eigenvector centrality, hub and authority centrality, it can be found that the importance of China and the United States is far beyond any other country. The difference is that the United States is a country with a stronger status as a hub and ally force of various important countries in international trade. But there is certain closure itself. In contrast, China's trade volume is slightly larger with more countries linked. It is also an important pole in the world trade pattern apart from the United States.

In Europe, the largest trade core is Germany, followed by the United Kingdom, France, Italy and Netherlands. Europe as a whole is relatively stable. However, it is worth noting that due to the impact of Brexit and the new trade order brought by the pandemic, the UK seems to lost its previous position in new relations with the world, and its connection with world trade has declined softly.

In Asia, Japan, South Korea and Hong Kong are the most important economies apart from China. Among them, Hong Kong has been relatively affected more during the epidemic, especially as an important hub of Asian trade; the descent of its trade status is a matter that needs to be paid attention to. In addition, Vietnam and India are rising under the pandemic environment with their strong manufacturing industry and trade volume, and may also become non-negligible nodes in the world trade network in the future.

North American countries, especially Canada and Mexico, rely on the great advantages of its border with the United States, and focus on strengthening regional trade in the environment of globalization to make steady progress in the epidemic. This is also worth studying and discussing.

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