Economy Papers Map of Co-occurrence Analysis Based on CSSCI

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Abstract

This article studied the key words from the 16406 economic papers which published on the twenty core journals of economy in CSSCI from 1998 to 2006 by the program compiled by the visual basic 6.0 and methods from SPSS 15.0 which we call mapping knowledge domain. Then we get the co-word matrix of high frequency key words, and we draw the mapping knowledge domain of economy by multidimensional scaling analysis and cluster analysis, which dynamically reveal the research hot of management on the academic area in our country during the recently nine years.

1   Introduction

Along with the continuous deepening of reform and opening up, China's economy develops rapidly. In the stage of regional economic integration and economic globalization, China has quickly integrated into the world industrial chain. During the transitional period, China's economy is entering the world economic area with a brand-new posture. The advance of economic strength and the rapid economic growth become the engine of the world economy. The socialist market-economic system has constantly improved; the market for factors of production is gradually becoming more mature. Especially, the ideas and strategies of economic development raised in the 17th People's Congress by the Communist Party of China has provided a broader focus space for all the economists. In such a drastic change of the times, it is a very practical and important issue for the Economist to master the direction of economic research and catch the hot spots of the economic life to serve the great practice and the Party's economic policy through more and better theories. The authoritative economists are the elites on the economic stage; they introduce the hot spots of a economic research period and guide economic community to trace these hot issues with their profound knowledge and shrewd

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awareness by the authorship, academic conferences, lectures and other informal channels of communication. These subjective judgments of the academic hot spots often contain certain limitations and can not accurately identify and grasp hot spots of a economic period. In order to make up for the experts' deficiencies of the judgments, we open a new path, and try to use a co-turn up analysis method in the field of information science to make a location about a period hot spot of economic research by the view of visualization and quantitative point.

2 Method

Liu Jun-wan (2004) and other experts have studied the China economic situation from a statistical point of view. In this paper we mainly adopt co-occurrence analysis. Co-occurrence analysis uses statistical methods and principles of psychology; analyses co-occurrence distribution of knowledge's unit of the text; discovers potential knowledge and its affiliates; and displays the results by the visual form (Wang Yue-fen et al. 2007). Experts call the results shown by this visual form knowledge map (Chen Yue et al. 2005). Knowledge map shows the development process and structure relationship of scientific knowledge. Its quiet emergent, on the one hand, reveals the change of scientific metrology from the mathematical expression to the graphics expression, which displays scientific knowledge and acting rules. On the other hand, it shows the change from the knowledge map of scientific knowledge of the geographical distribution to the relations of knowledge structure and the rule of evolution demonstrated by image. Co-occurrence analysis, which is used in the paper written by Kessler, R. C. et al. (1997), includes a co-author analysis, co-journal analysis, co-word analysis, co-citation analysis etc. We choose co-word analysis of the key words to analyse knowledge of economics text. Keyword is an important part of an academic paper, though there are only a few words accounting for small room in the paper, but it is the essence of paper. Not only can it use key words to search the literature, but also we can know the field and content involved in the literature. Co-word analysis is a technology of content analysis, and we can find the hot spot

through clustering high frequency key words (Liu Ze-yuan et al. 2006). There are several papers which discuss this issue, co-word analysis (Bhattacharya, S. et al. 1998; Callon, M. et al. 1991; Callon, M. et al. 1983; De Looze et al. 1997; Ding, Y. et al. 2001; Law, J. et al. 1988; Turner, W. A. et al. 1991).

We take the first three key words of each article from these CSSCI 16406 papers to make the statistics, and we take the actual number if the number of key words is less than three, then do co-word Analysis to some high frequency key words. After making the preliminary statistics to the key words through Visual Basic6.0 software, we make the correlation analysis, the multi-dimensional criterion analysis and cluster analysis by the SPSS15.0 software (Zhang Han et al. 2007; Small, H. 1973; Katherine W. McCain 1991).

3 Data

The data in this paper comes from the top 20 economics journals (see table 1) of the Chinese Social Science Citation Index (CSSCI) including 16,406 papers from 1998 to 2006 in Economics. There are more than seventy economic journals in the CSSCI database. We choose these journals because of their important influence in the economy journals, and the impact factor of these journals was the top twenty in the year 2006. So these journals are representative, which ensure that we can study the large sample by bibliometrics.

Table 1. Economy journals whose impact factor in the top twenty in 2006

Rank	Journal Name
1	Economic Research
2	China Industrial Economy
3	Financial Research
4	Comparing the Economic and Social System
5	World Economy
6	Accounting Research
7	China Rural economy
8	International Economic Review
9	Economic Science

10	Reform
11	Dynamic Economics
12	Observation of China Rural Areas
13	Finance and Trade economy
14	Agricultural Economic Issues
15	Economic Theory and Economic Management
16	International Institute for Monetary Research
17	Economists
18	Financial Research
19	Nankai Economic Research
20	International Trade

4 Results

Getting the frequency statistics and the order of key words in the download data used by Visual Basic6.0 procedures, we can enlist a series of high-frequency key words (see table 2), and then make a Co-word Matrix of the high-frequency key words, finally we choose the high-frequency key words on the top 20 to make a Co-word matrix. And some key words are listed related to the two most frequently-used words: monetary policy and economic growth. (see table 3, Table 4).

From the ranking table (Table 2) of the high-frequency key words, we can see that monetary policy and economic growth are the top two in all the key words. We can generally judge that they are the hot points of domestic Economics. Monetary policy is one of the country's important methods in regulating macro economy, with the gradual improvement of socialist market economic system; the market plays a leading role in the configuration of production factors. However, the role of the government still can not be neglected; this is an important means of economic management that every market economy country uses. Financial plays very important role in market economy. Financial institutions ensure the healthy development of the national economy through interest rates, exchange rates, stocks, bonds and other financial instruments. First of all, we must control the banks if we want to control economy, because we can't control the economy if we

can't control the banks. In recent years, we have focused on banks, which is really effective. The banking reform is accelerating, since we joint the WTO. It is necessary to enhance their competitiveness, guard against credit risk, and increase economic efficiency.

Table 2: The top 50 high frequency key words

rank	key word	frequency
1	monetary policy	412
2	economic growth	278
3	WTO	275
4	commercial banks	272
5	securities market	203
6	capital market	190
7	agriculture industrialization	162
8	stock market	160
9	financial crisis	156
10	financial policy	150
11	listed company	150
12	financial risks	149
13	financial supervision	144
14	financial market	139
15	RMB exchange rate	137
16	rural economy	135
17	farmers income	134
18	China's economy	127
19	financial reform	114
20	deflation	112
21	international trade	110
22	agricultural economy	109
23	industrial structure	109
24	market economy	102
25	China financial	98
26	the Asian financial crisis	92
27	foreign direct investment	92
28	financial innovation	88
29	western development	85
30	human capital	84
31	system innovation	84
32	state-owned commercial banks	83
33	exchange rate system	82
34	sustainable development	80
35	regional economic	80
36	rural credit cooperatives	79

37	economic globalization	79
38	the Euro	76
39	financial development	75
40	inflation	74
41	agricultural modernization	70
42	China agriculture	69
43	asymmetric information	69
44	RMB	69
45	urbanization	68
46	foreign trade	64
47	macro-control	64
48	central bank	64
49	international competitiveness	61
50	three rurals	61

From table 2 we find that the first 20 high-frequency key words can basically show several major areas economics' concern. It also shows that finance is a widely concerned hot spot. In order to fulfil the commitment of joining the WTO, the Chinese government has abolished limits of interest, region and quantity when foreign investment is in financial sector at the end of 2006, and then we will usher a new situation for financial sector's full open. Foreign banks, brokerage firms, insurance companies, investment banks and other financial companies have mostly established their branches in China, and our financial industry is facing a great challenge. At the same time, the RMB exchange rate issue is one of the academic hot spots. In addition, the rural areas and agricultural economy closely linked with China national conditions have also been noticed.

In China, economic development becomes the top priority of all work. Taking economic construction as the core and improving the comprehensive national strength and people's material and cultural living standards is the one of the main tasks during the initial stage of socialism. Economic growth is the prerequisite and guarantee of economic and social development. How to promote economic growth well and quickly is not only a major research topic of economy, but also the common concern discourse in the every economics subject. Therefore, higher frequency of the "economic growth" reflects the research centre of economic circles

in a certain extent. Frequencies of WTO, commercial banks, security markets are more than 200 times, which arouses great concern when China appears a series of theoretical and practical issues in the integration process of economic globalization. The key of the financial system reform is to establish the commercial banking system operation-efficiently. As financial carriers, people attach too much importance to the management structure, status and role of the commercial banks in the modern market economy. The establishment and improvement of capital markets are still important to the modern enterprise system construction, the reasonable distribution of wealth, the expansion of investment and financing channels.

Table 3: The top 20 key words which have co-word relationship with the "monetary policy".

key word	frequency of co-occurrence
fiscal policy	41
deflation	35
inflation	14
Central Bank	12
stock market	10
macro-control	7
capital market	7
RMB exchange rate	7
exchange rate system	7
economic growth	6
the Euro	6
financial reform	5
financial risks	5
financial supervision	5
financial market	5
China finance	4
RMB	3
China's economy	3
commercial banks	2
financial innovation	2

In table 3, there are 20 high frequency words co-occurrence with the "monetary policy", so that we can further detailed information from the related research topics. Centring on the theme of monetary policy, fiscal policy is associated with

this. The frequency of inflation, deflation, central banks, the stock market is over 10 times, this indicates that the used effectiveness of the control means which the state uses to adapt to the state's economic change is becoming a pressing issue that economics make economic development sustained and healthy, while how healthy and orderly is the capital market is also an important research topic with regard to enterprise development and the rational flow of residents capital (Liu Yu-hong and Gao Tie-wei 2007; Dai Jin-ping and Jin Yong-jun 2006).

The high frequency words that have co-relation with "economic growth" are the words of financial development, China's economy, stock market, and so on. This shows that contemporary Chinese economists pay more attention to the practical problem of China domestic economic growth and to the action mechanism in the financial system of economic growth, while the development and improvement capital market have become an important force that promotes China economic growth.

Table 4: The top 15 key words which have co-word relationship with the "economy growth".

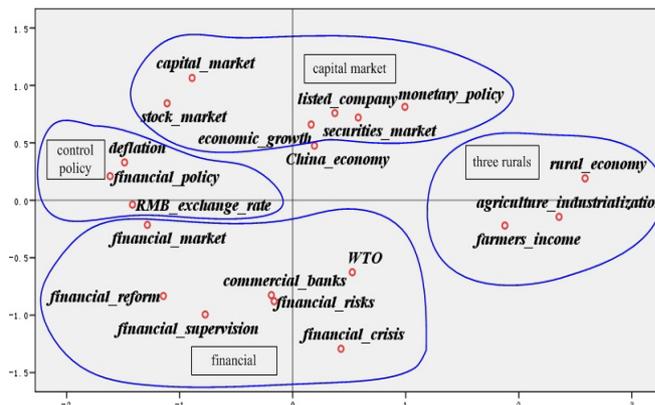| key word	frequency of co-occurrence
financial development	16
China's economy	9
stock market	8
human capital	8
industrial structure	7
monetary policy	6
inflation	6
capital market	5
foreign trade	5
system innovation	3
foreign direct investment	3
fiscal policy	3
international trade	3
Deflation	3
China financial	2

Figure 1: The mapping knowledge domain of the economy key word.

We used the top 20 high frequency key words to make a co-word matrix, in order to display the hot spot in economy. Then we imported the matrix into SPSS15.0 and did the correlation analysis, multi-dimensional scale analysis and cluster analysis, so that we got the co-word mapping knowledge domain in figure 1. The key words could be divided into four knowledge groups according to the results from the cluster analysis. In figure 1, we can see clearly that "China's economy" is in the centre near the origin point. "financial reform", "financial supervision", "financial market", "financial crisis", "financial risks", "commercial banks" and "WTO" form a knowledge group we call it "financial group"; "capital market", "stock market", "securities market" etc. form the "capital market group"; "fiscal policy" and "financial constraints" etc. constitute a "control policy group"; "rural economy", "farmers' income" and "agriculture industrialization" constitute "rural-related groups". The financial filed is a major research area of economy. The key words which have relationship with the "financial" in the two groups near the origin and "China's economy". It showed that the financial field is the focus of economy, and it is the most popular area. Related to the financial field, we should also concern the capital market, money market, securities market, the stock market and other financial markets and their relations in the economic system (Chang Zhong-ze 2007). In the open economy, China financial and monetary policies faced various challenges. In figure

1, "financial reform" and "financial supervision" which belong to "monetary policy", is close to "fiscal policy", and they all belong to the state's macro-economic policies.

In table 3, we can find that "financial policy" and "monetary policy" are the two key words with highest frequency. Both of the two policies are the macro-control tools, and they often co-occur in the economic documents. In recent years, many people are afraid of a series of problems such as deflation which are brought by the RMB revaluation, but we can avoid the problems by macro-control tools, and we can also effectively reduce the major impact of RMB revaluation on prices and the high price levels. It is proved that the national control methods are desirable. In figure 1, there is one relatively independent field called "rural-related groups" including the key words "rural economy" and "farmers' income" and "agriculture industrialization". As a large agricultural country, solving the rural problems is the top priority of China economic development, the development of modern agriculture and rural economy is the current primary task. So we can see that the scholars also focus on the rural related issues among the economic issues.

5   Conclusions

Over the last decade, the most popular areas of the domestic economy were finance, capital markets, and then the Chinese macro-control policies and the rural economy. It can be said that, China accession to the WTO, has put a higher demand to the government macroeconomic and financial policies of intervening the market economy, the state-owned commercial banks face the significant competitive pressures (Wen Shu-ying 2006). The system innovation of the domestic securities market, capital market should deeply promote. While the rural related issues are the research area needs more concern (Li Yong et al. 2005).

Co-word analysis provides an effective way that links the content of the document text directly and quantitatively. It reflects interrelationship between different themes by the Co-occurrence of different words. As an information measurement method Co-word analysis can help us understand the latest development of

a certain areas quickly. As the CSSCI Key words indexing has not yet been realized standardization, the key words of the economics texts are more dependent on the author. Moreover, the key words still can not cover all the important knowledge and information, so some important knowledge is missed inevitably through this method. As Tijssen (1992) says, from the general sense, co-word mapping knowledge domain is only a man-made "snapshot" - summarizing information of scientific system, and has yet to be further improved. The hot areas of economics text still have provided us with the major clues of economic progress in recent years by above means.

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