

Analysis on the Difference of Dynamic Relationship between Development of Culture industry and Economic Growth of China and the U.S.

Xia Yidan^{1,2*}

¹College of Finance and Statistics, Hunan University, Shangjiachon, ChangSha city, HuNan Province, China, 410079

²School of International Studies Hunan University of Commerce, YuLu str. 569, ChangSha city, HuNan Province, China, 210025

Received 6 October 2014, www.cmmt.lv

Abstract

Nowadays, the viewpoint that culture industry could contribute to economic growth has become the mainstream. Many scholars have proved economic role of cultural industries in their researches, but very few scholars have carried out researches on dynamic relationship of industrial development and economic growth. In view of comparative perspective between China and the U.S., in this paper, the difference of dynamic relationship of culture industry development and economic growth is researched by constructing SVAR model. Results show that culture industry has formed a complete system in the U.S., displaying a significant economic role which is stable and lasting, and in return economic growth also promotes the rapid development of culture industry, both of which shows an obvious interaction promotion mechanism. However, in China, culture industry scale is small, and it does not perform positive economic role, but instead brings economic growth long term fluctuations. Moreover, the promotion of economic growth to the development of culture industry is limited, and no promotion mechanism exists between them. Therefore, the development of culture industry should be advanced gradually, and correspondingly some policies and suggestions are presented in this paper.

Keywords: SOFC; Discrete Sliding Mode; Control; DC/AC; Converter

1 Introduction

At the end of the last century, the term culture industry had been the hotspot in academia. Scholars from all over the world began to discuss the concept of culture industry, the significance of developing culture industry and its development strategy. Since entering the 21st century, great achievements about culture industry research has been made, and theories of culture industry development in different economic systems were formed preliminarily.

After the global financial crisis in 2008, the vulnerability of leading industry in present economic system was better recognized. Additionally, with global climate and environment deteriorating, a sustainable way in economic development needs to be explored, so the term “culture industry” becomes a hot word once again. The products of culture industry, characterized itself by unique production and consumption characteristics, gets special title like “Gold Industry” and “Smokeless Industry” etc., the relationship between which and economic is being the research priority in academia. Presently, China’s economic development is staying in transition and its culture industry scale is being enlarging year by year, so to reemphasize the relationship between economic growth and culture industry is an approach to explore the support to develop culture industry theory.

In different countries, the concept and characteristic of culture industry are interpreted differently. For example, in the U.S., culture industry is named copyright industry, indicating its protection to creation right in cultural field. In addition,

culture industry in the U.S. is topping the world, and its economic role cannot be neglected. Therefore, in this paper, taking culture industry in the U.S. as comparison, it carries out difference research of relationship of culture industry and economic growth between China and the U.S., and then it studies the experience and lesson of U.S. culture industry development, finally exploring an appropriate way to develop culture industry in China present economic system.

2 Related research condition and review

Development of culture industry originated from western developed countries, and western scholars have conducted numerous researches on culture industry, in which the view that culture industry development could promote economic growth and increase national employment opportunity was widely acknowledged. It is clearly pointed out in economic contribution report of culture industry (2012) by WIPO that publishing right and creativity equal with employment and economic growth. By calculating and comparing the contribution rates of GDP and culture industry employment from global 30 countries’ cultural industries according to the broadest statistical caliber of culture industry, it is found that U.S. economic contribution rate of copyright industry is the highest, reaching to 6.5%, and employment contribution rate is about 8.6%; while Chinese economic contribution rate of industry culture industry is 6.4% and employment contribution rate is 6.5%, and both of the two figures are around the average of these 30 countries.

* Corresponding author’s e-mail: xiayidan+@163.com

With the development of economic globalization, culture industry has been attached more importance by the Party and government, and moreover culture industry development is emphasized on and promoted strongly in economic development program. Meanwhile, the researches on culture industry in academia at home and abroad are growing rapidly, and especially on the relationship of culture industry and economic growth, great achievements have been made in domestic. Liu Dengzuo et al. (2008) conducted a comparison between China and foreign countries on culture industry to national economic contribution rate, employment contribution rate and cultural consumption, and further analyzed the reasons of Chinese culture industry's weak economic role [1]. Wang Lin et al. (2009) took Yangtze River Delta Area as research object and analyzed the significance of culture industry to economic growth based on endogenous growth theory, considering that the development of culture industry could make a great significance to economic growth [2]. Lu Lixin (2009) taking investment volume of Chinese culture industry as its development index, built error correction model and vector auto regression model between culture industry and economic growth, coming to a conclusion that about 25% economic growth are benefiting from the investment of culture industry in method of variance decomposition [3]. However, Zhang Bin (2009) did not completely accept the mainstream view that has formed in the world but instead he questioned the view that culture industry investment is the main impetus for developed country economic growth because different country have different statistical caliber. Then, based on industrial economy development data of various countries, he proposed that the ratio of culture industry in developed country was not as big as imagined. Hence, we should not exaggerate the role of culture industry, but should stop the exaggeration over culture industry, make scientific policy and develop culture industry rationally and concretely, which provide valuable suggestions to develop Chinese culture industry. Cai Wangchun (2010) analyzed indirect economic role of culture industry from the perspective of industrial structure optimization, considering that culture industry had strong diffusion effect, benefited for industrial structure optimization and played an important promotion role in economic growth [4]. Chen Shiqing (2010) taking Hunan Province as research object, analyzed economic growth role of culture industry empirically, and considered that culture industry plays a significant role in economic growth. However, Hunan culture industry was not flexible, so it indicated that culture industry had a rather large development space [5]. Li Zengfu (2011) by adopting grey correlation degree method analyzed the contribution role of culture industry's three levels to economic growth, considering that the related level of present culture industry exerted the most significant role to China economic growth, which indicated that the development of Chinese culture industry's core layer is still lagging behind [6].

From the research results at home and abroad, culture industry indeed promoted present economic growth. In the

research on relationship between culture industry and economic growth, many research methods are used from different perspectives, and most of the results show that culture industry displays a positive role in economic growth in China. However, in measurement of culture industry development, most scholars selected other variables instead of value added, but the variables except for value added could not measure culture industry development correctly, thus leading to departure between research object and actual development condition, and even reaching a false result. From research perspectives, most scholars just emphasized domestic development condition and neglected comparison between home and abroad. Few scholars analyzed China's development path referring to foreign developing experience, but did not make a detailed comparison from domestic and foreign development paths. Therefore, in this paper, by using culture industry value added to measure industrial development level, the difference of the relationships between culture industry and economic growth is analyzed, the difference of development condition between two countries is emphasized, and by studying the development experience of great power's culture industry, disadvantages in Chinese culture industry's development are further explored.

3 Empirical analysis

In this paper, the research on relationship between culture industry and economic growth is carried out mainly from the perspective of China and the U.S. comparison, in which culture industry development scale is represented by various years' culture industry value added and scope of data includes culture industry and all aspects of its relevant industries. In the U.S., culture industry development data is represented by its copyright industry value added, in which U.S. copyright industry includes most of the business in culture industry and data resource is from development report of U.S. culture industry and World Bank. Chinese culture industry value added is arranged from the data published by State Statistics Bureau, and GDP data are from China Statistical Yearbook. Due to different availabilities of data, U.S. research time was from 1987 to 2013, while China was from 1998 to 2013, in which the data of two countries were calculated by national currency unit. In statistical research, in the U.S. Log Koc of various indexes was used as research sample, while in China first order difference value of various indexes was used as research sample, and both of them measured the growth rate of indexes. Economic growth is represented by Y, and culture industry value added is represented by X.

1). Direct comparison between China and the U.S. culture industry developments

China starts late on culture industry, and from previous researches, the development process of Chinese culture industry can be divided as three stages. The first stage is from Reform and Opening-up (1978) to 2000, also called spontaneity stage of culture industry development, and this stage characterized itself by small scale, slow development

and even scattered researches. Seen from the data published by State Statistics Bureau, in 1990 China's whole culture industry value added was about 1.21 billion, but until 2000 it reached to 11.89 billion. Thus, it can be concluded that in 1990 the value added of China's whole culture industry and its relevant industries was about 9.151 billion, accounting for about 0.49% of GDP. Therefore, it shows that Chinese culture industry began to develop gradually until late of the last century. The second stage is from entering 21st century (2000) to 2003, also called reasonable exploration stage, and at this stage numerous achievements of culture industry research had been made in academia, providing theoretical

guidance for rapid development in this industry. It shows that the ratio of value added in GDP rises from 1% to 2%. The third stage is from 2003 to now, which was also called reform and promotion stage, and this stage characterized itself by gradual and steady development scale, but the development at this stage was restricted within the reform areas, thus making the breakthrough of industrial development path especially important. Figure 1 displays a tendency of China and the U.S. culture industry developments and GDP, from which the three stages in Chinese culture industry development could be clearly seen.

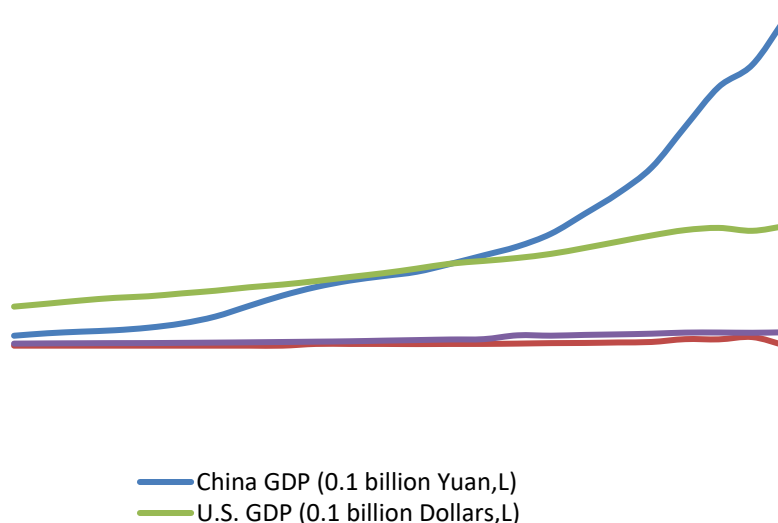


FIGURE 1 Tendency of value added of China and the U.S. culture industry and GDP

The U.S. is always running ahead of the world in culture industry. Its cultural product export dominated by film and TV industry holds an important status in global trade, and the development of cultural copyright industry has promoted U.S. employment, so U.S. culture industry has become an important pillar in economic growth. In 1977, the value added of U.S. culture industry reached to 73.6 billion Dollars, accounting for 3.73% of GDP, and in 1987, it reached to 5.45%, far greater than most other countries, so cultural copyright industry has become one of important factors in economic growth. As shown in Figure 1, in the last century, U.S. culture industry had been growing steadily with culture industry scale enlarging year by year. After entering the 21st century, as a new development platform, copyright industry advanced rapidly. However, in recent years the development of copyright industry almost reached its saturation, so its development speed was reducing slightly.

Compared with the development conditions of China and the U.S. culture industry from direct data, it shows that Chinese culture industry development is lagged, its base is weak, scale is small, and economic role is not obvious. In spite of this, the development speed is considerable because in just two decades it reached from 9.151 billion Yuan to 1105.2 billion Yuan, nearly increasing by 120 times; while in the U.S. it merely increased by 28 times within 36 years

from 1977 to 2013. Hence, development speed of Chinese culture industry is considerable and its potential is huge. Figure 1 displays the tendency of two countries' GDP, and it can be shown in Figure 1 that growth rate of U.S. copyright industry is much higher than industry's growth rate. Its drivers of economic growth most came from cultural copyright industry. However, Chinese culture industry nearly kept a balanced pace with economic growth, and economic promotion of culture industry is not as great as imagined, but it performs a strong power drive.

2). Statistical research comparison of dynamic response relationship between industry development and economic growth

The main aim of this research is to analyze the difference of dynamic relationship between China and the U.S. culture industry and economic growth. By non-structure method, VAR model solved the problem of endogenous variables in traditional theory of modeling. It constructed model by taking each endogenous variable in system as the function of all endogenous variables' lagged values, and then generated dynamic relationship of all variables. Meanwhile, VAR model could be also used to predict the development and random disturbance term of the time series in economic system (also called dynamic impact of information to whole economic system), thus it could explain the effects of all

impacts on economic system.

Lagged VAR model of order P can be expressed as follows [8]:

$$y_t = f_1 y_{t-1} + L + f_p y_{t-p} + \phi x_t + \varepsilon_t$$

$$t = 1, 2, L, T \quad (1)$$

where, y_t is column vector of endogenous variable in k dimension, x_t is column vector of exogenous variable in d dimension, p is lagged end, T is number of samples, and ε_t random disturbance term of model.

However, in Equation (1), it shows that explaining variable in VAR model includes no endogenous variable in system, while endogenous variable information is concluded in random disturbance term, which could not make current period relationship among system internal variables be explained, so the equation above is a simplified form of VAR model. Two variables' SVAR model, called VAR model, is the structural formula of it, i.e., containing current period relationship among variables in model, by which effects among endogenous variables in system could be explained.

Two variables' lagged order p structure, VAR model, could be expressed by the following equations:

$$y_t = \alpha_{10} + \alpha_{11} y_{t-1} + L + \alpha_{1p} y_{t-p} + \beta_{10} x_t$$

$$+ \beta_{11} x_{t-1} + L + \beta_{1p} x_{t-p} + \mu_{yt}$$

$$x_t = \alpha_{20} + \alpha_{21} x_{t-1} + L + \alpha_{2p} x_{t-p} + \beta_{20} y_t$$

$$+ \beta_{21} y_{t-1} + L + \beta_{2p} y_{t-p} + \mu_{xt}$$

$$t = 1, 2, L, T \quad (2)$$

where, x_t and y_t are both endogenous variables in research system; coefficient β_{10} and β_{20} are prompt effects of variable x_t and y_t unit change to dependent variable respectively; α_{1p} and α_{2p} represent the lagged effects of variable y_{t-p} and x_{t-p} unit change to each dependent variable respectively, μ_{yt} and μ_{xt} represent random impacts in x_t and y_t respectively; but when $\beta_{20} \neq 0$, random impact μ_{yt} will affect x_t instantly by affecting y_t . Similarly, when $\beta_{10} \neq 0$, random impact μ_{xt} will affect y_t instantly by affecting x_t . Therefore, impact mutual effects indicate bi-directional nature and feedback of dynamic function among variables.

Using matrix to describe dual order p structure VAR model, we can express it as follows:

$$CZ_t = \Gamma_0 + \Gamma_1 Z_{t-1} + L \Gamma_p Z_{t-p} + \varepsilon_t$$

$$t = 1, 2, L, T \quad (3)$$

$$\text{where, } Z_t = \begin{pmatrix} y_t \\ x_t \end{pmatrix}; \quad C = \begin{pmatrix} 1 & -\beta_{10} \\ -\beta_{20} & 1 \end{pmatrix}; \quad \Gamma_0 = \begin{pmatrix} \alpha_{10} \\ \alpha_{20} \end{pmatrix};$$

$$\Gamma_i = \begin{pmatrix} \alpha_{1i} & \beta_{1i} \\ \beta_{2i} & \alpha_{2i} \end{pmatrix}, \quad i = 1, 2, L, p; \quad \varepsilon_t = \begin{pmatrix} \mu_{yt} \\ \mu_{xt} \end{pmatrix}.$$

If matrix C is invertible matrix, conducting left multiplication C^{-1} to Equation (3), we could obtain the following equation:

$$Z_t = C^{-1} \Gamma_0 + C^{-1} \Gamma_1 Z_{t-1} + L C^{-1} \Gamma_p Z_{t-p} + \mu_t$$

$$\mu_t = C^{-1} \varepsilon_t \quad (4)$$

As shown from above, Equation (4) is greatly similar with Equation (1), so under certain condition structural equation can be transformed into reduced-form equation. Hence, we can obtain AB model and SVAR model, with expressions as bellow:

$$A \varepsilon_t = B \mu_t, \quad t = 1, 2, L, T \quad (5)$$

Where, ε_t is disturbing term of VAR model, i.e., reduced-form residual, and μ_t is structural impact, i.e., structural residual.

The evaluation of structural VAR model depends on model identification, i.e., seeking for effective constraint condition of model, and then unknown parameters in model are evaluated. In the evaluation of AB model and SVAR model, the main work is to restrain Matrix A and Matrix B. In this paper, software EvIEWS is used to build SVAR models of China and the U.S. culture industry and economic growth, and then the difference of dynamic relationship between the two models are analyzed.

In factual modeling, economic role of research questions is usually used to restrain Matrix A and Matrix B. According to the ready samples, lagged order 2 SVAR models are constructed for China and the U.S. culture industry and economic growth.

$$\text{Where, assuming Matrix A} = \begin{pmatrix} 1 & \alpha_{12} \\ \alpha_{21} & 1 \end{pmatrix}, \quad \text{Matrix}$$

$$B = \begin{pmatrix} \beta_{11} & 0 \\ 0 & \beta_{22} \end{pmatrix}, \quad \text{then Matrix A is restrained to leading}$$

diagonal which is 1; while Matrix B is diagonal matrix. Additionally, to realize the whole model identification, a constraint condition needs to be added. In view of theoretical relationship between culture industry development and economic growth, the former could contribute to the latter immediately but the latter could not benefit immediately for the former during current period. So, we assume that $\alpha_{12} = 0$ in Matrix A, set evaluation residual of VAR model $\hat{\varepsilon}_t = e_t$, and then we can obtain AB model and SVAR model of Chinese culture industry development and economic growth as follows:

$$\begin{aligned} e_{1t} &= 0.1\hat{\mu}_{1t} \\ e_{2t} &= 0.1e_{1t} + 0.1\hat{\mu}_{2t} \end{aligned} \quad (6)$$

Similarly, we can obtain AB model and SVAR model of U.S. culture industry development and economic growth as follows:

$$\begin{aligned} e_{1t} &= 0.5993\hat{\mu}_{1t} \\ e_{2t} &= 0.0216e_{1t} + 0.0933\hat{\mu}_{2t} \end{aligned} \quad (7)$$

To construct SVAR model of culture industry and economic growth is not the emphasis in this paper, but instead, by constructing SVAR model, it is to analyze the difference of dynamic response between China and the U.S. culture industry development and economic growth. Therefore, further researches on impulse response function and variance decomposition between two variables needs to be carried out. Usually, the two researches require a high stability for the models, because unstable model usually brings incorrect impulse response and variance decomposition results. Hence, stability test to models needs to be conducted. For VAR model, stability test mainly depends on the AR reciprocal of root of a polynomial. If all the evaluated reciprocals of AR roots in VAR model are less than 1, i.e., reciprocals of AR roots being all in unit circle, and then the evaluated VAR model is considered to be stable. In Figure 2 and 3, location relationship between China and the U.S. SVAR models' AR reciprocals of roots with unit circle. As shown in Figures, the two models' AR reciprocals of roots are located in unit circle, so the SVAR model we construct is stable.

Based on stable models, the relationship of impulse response function between culture industry development and economic growth can be analyzed. One of the features of VAR model is not analyzing the effects of one variable on another one, but analyzing the change of one error term or effects of one pulse on the whole system, and this method is also called impulse response function method.

Inverse Roots of AR Characteristic Polynomial

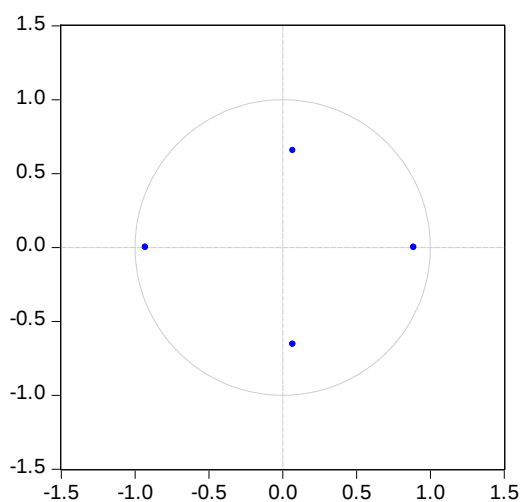


FIGURE 2 China SVAR model' AR reciprocal of root

Inverse Roots of AR Characteristic Polynomial

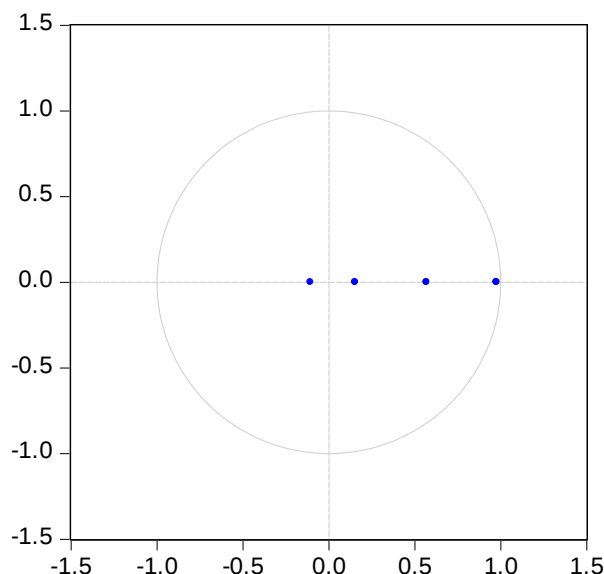


FIGURE 3 U.S. SVAR model' AR reciprocal of root

China and the U.S. SVAR model's impulse response function are presented in Figure 4 and 5, respectively. Upper part of Figures show the responses of economic growth (DY and LX) to economic growth rate and cultural industrial growth, and lower part of Figures show the responses of cultural industrial growth (DX and LX) to economic growth impulse and cultural industrial growth impulse.

As shown in Figure 4, a shock (Shock 1) on economic growth rate exerted by current period would lead to two periods' decreases for economic growth rate (DY) within system. Afterwards, every two emerged periods are a period fluctuation, and this fluctuation will last for a long time, but it basically stays above zero and presents a long-term decline trend. Additionally, the shock (Shock 1) on economic growth benefits not too much for economic growth rate (DX), i.e., the response of cultural industrial growth to economic growth rate is nearly zero. In current period, the shock (Shock 2) on cultural industrial growth could similarly lead to a long-term fluctuation for economic growth rate (DY), and the response of current period economic growth rate is a negative fluctuation. So, it indicates that the positive function of Chinese culture industry to economic growth is limited at present. At the same time, this shock will result in lower increases in current period, later two periods' slight rally, and in 6th period, this shock function is nearly zero.

In Figure 5, dynamic response functions of U.S. culture industry and economic growth are presented. In the long run, a shock (Shock 1) on economic growth decreases economic growth rate (LY) within system, and this tendency possesses a strong sustainability. However, this shock (Shock 1) exerts a positive impetus for U.S. cultural industrial growth, with cultural industrial growth rate (LX) enlarging gradually, and in 5th period, it reaches the maximum and will be lasting. Hence, a strong co-movement

exists between U.S. culture industry and its economic system. If a shock (Shock 2) is exerted to cultural industrial growth (LX) in current period, economic growth rate (LY) will enlarge from present zero, and until the 6th period it reaches the maximum and will be lasting. Therefore, this system shows a strong promotion of U.S. culture industry to its economic growth. In addition, the shock (Shock 2) on cultural industrial growth rate decreases its growth rate as well, but not decreasing to zero, instead decreasing to a certain value and then lasting on-going.

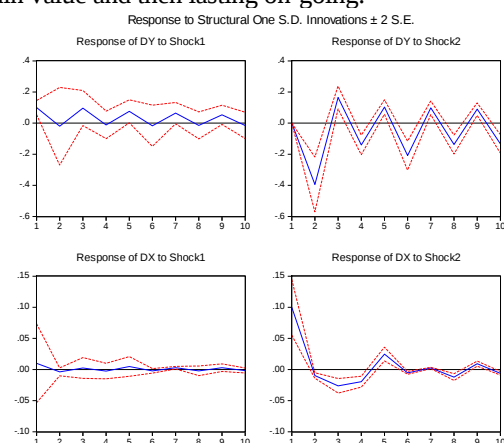


FIGURE 4 Impulse response function of China SVAR model

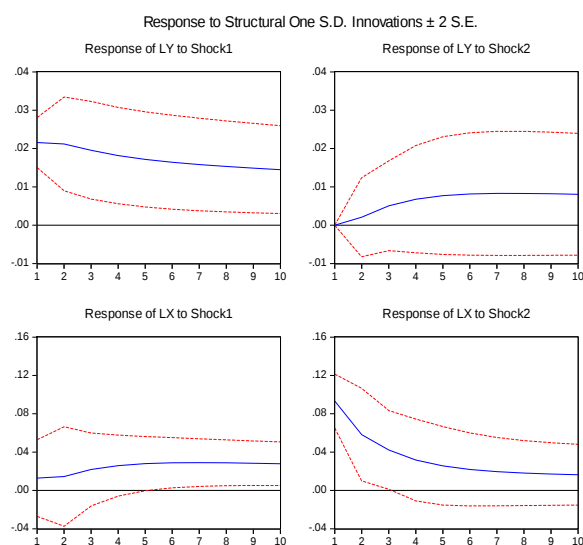


FIGURE 5 Impulse response function of U.S. SVAR model

Therefore, the dynamic response relationship between China and the U.S. in culture industry development and economic growth is largely different. U.S. economic growth can promote culture industry development, and in return culture industry development can boost economic lasting growth. This mutual effect is long-term, steadily strengthening and significant. But, China economic growth contributes not too much to culture industry development, or even this function is zero, and culture industry development does not bring economic prosperity, but increases the punctuation of economic growth. So, Chinese culture industry shows no strong economic role at present.

4 Conclusions and suggestions

The relationship between culture industry and economic growth keeps being a research hotspot in academia. Nowadays all over the world, the viewpoint that the culture industry especially the developed countries promote economic growth has become the mainstream. Exactly, the ratio of culture industry value added of developed countries in DGP could prove this viewpoint. Besides, it is considered by many developing countries in research that culture industry has strong economic role. For example, many scholars using culture industry investment to measure the industry scale, and further analyze its promotion to China economic growth. However, all these researches did not seize the relationship between culture industry and economic growth in their dynamic responses, so in this paper, perspective from the difference of relationship between China and the U.S. in culture industry and economic growth is selected. Based on a direct comparison, it constructs SVAR model of culture industry development and economic growth, by which the difference of dynamic relationship between China and the U.S. in culture industry and economic growth is analyzed. Results show that U.S. economic growth can promote its culture industry development and in return culture industry development can promote its economic rapid growth as well, and this co-movement relation is long-term, strong and steady. However, China economic growth does not promote culture industry development and culture industry development does not promote economic growth as well, but instead leads to a long-term fluctuation for economic growth, which indicates that in Chinese culture industry shows no promotion in its economic growth. Therefore, the viewpoint in Literature is agreed upon in this paper, i.e., China should be careful in developing culture industry.

Compared with U.S. culture industry topping the world, in Chinese culture industry enjoys a short time in combination with its developing process, and even we can say it is still in cultural system construction. Besides, Chinese industry basis is weak, scale is small, industry investors are scattered, cultural market operation mechanism is not built completely, culture industry development space is not attractive, industry brain drain is heavy, law mechanism within system is not perfect, cultural copyright cannot be protected, maintenance cost of cultural creation is high, no culture industry system characterized by any industry is formed, and China does not take its full advantages in international cultural trade. All these reasons lead to small scale of Chinese culture industry, and compared with other fully reinforced industry, the promotion of culture industry to economic growth is so insignificant.

Seen from the process of world developed countries, culture industry indeed boosted economic prosperity. Especially in the era that stresses sustainable economic development, known as "Smokeless Industry", culture industry could give full play to economic promotion. So, it is imperative for China to strive to develop culture industry, which could bring more than future economic prosperity and accelerate the blossoming and renaissance of Chinese

traditional cultural. In this process, must draw attention is that we should not pursue overly rapid economic role of culture industry, but boost its development for the purpose of economic prosperity

In view of the development experiences of countries in the world, a country's culture industry development cannot live without pillar industry inside culture industry. For example, the U.S. takes its film and TV industry as pillar industry of culture industry, which not only drives the development of national culture industry but also makes itself in an invincible position in international trade. Meanwhile, the U.S. attaches importance to brand building, e.g., Hollywood has become the synonym of its film and TV industry as well as the world-recognized bellwether in film and TV industry. Thus, it can be seen that in China, culture industry also cannot live without some pillar industry. To find an appropriate pillar industry that can reflect Chinese cultural features is the strategic point. With a long history, extensive and profound folk culture, and various featured ethnic cultures, obviously, it is a sound strategy to take Chinese traditional culture as the pillar industry of culture industry development. Traditional culture is huge wealth, so to boost it could promote the development of culture industry, and moreover it could revive Chinese thousand years of cultures, make it world well-known, and increase the understanding of world people to our traditional culture. In the new era, it is needed to combine present condition with requirement of new age, tradition with innovation, domestic culture with foreign culture. Then, it can reduce the difficulty for the outside world to understand our traditional culture, and moreover invigorate our traditional culture with new element and vitality, contributing to cultural inheritance and dissemination.

Taking traditional culture as the pillar industry in culture industry cannot be separated from financial supports. Presently, the defects of Chinese culture industry development are diversification of the main investors, decentralization, portfolio diversification and small investment scale. For rather a long time, insufficient attention to culture industry is an important reason to lead to the under-investment of culture industry. Therefore, the government should put culture industry investment, especially its supporting policy in the first place, utilize government investment to promote private investment and guide capital to flowing into culture industry. In addition,

the government could support traditional industry development with preferential policy e.g., tax relief, creating a good market environment for culture industry investment.

Another reason of Chinese culture industry slow development is insufficient domestic cultural consumption. In China, cultural resource is abundant, cultural content is broad, and cultural form is various, but the people is not active in cultural participation, and domestic cultural consumption is insufficient. This exerts a bad influence on the production of cultural product, and even hinders the cultural inheritance and dissemination, thus affecting the whole industry development. Hence, to develop culture industry and promote cultural consumption is extremely urgent, which demands that the government should improve the trading operation mechanism of cultural products in market economy, and provide a good trading platform for culture industry. Additionally, the government should propel mass consumption, strengthen traditional culture propaganda, promote traditional culture innovation, encourage organizing large-scale cultural activity and finally promote cultural dissemination.

Once compared with the U.S. again, one of the most important reasons why the U.S. named its culture industry as copyright industry is that the U.S. attaches importance to culture industry. In the U.S., the prefect laws and regulations of copyright protection could not only protect creator's achievements but also encourage the development of originality. The laws of copyright protect and attract cultural figures from all over the world to come to the U.S., and the brain gain in return promote a further development of its culture industry. Presently, however, China lacks of complete protection system to creation right, plagiarism in cultural products market is rampant, original ability of culture creation is low, and maintenance cost is high, all of which disturb normal operations in culture industry, thus hindering the development of culture industry. Therefore, to improve laws and regulations to protect culture creation is critically important. Its significance is more than protecting creator's achievements, and moreover it can crack down pirate and plagiarism, stabilize cultural operation market, promote the development of original culture, detain outflowing cultural figures, and even attract foreign cultural figures to flow in, all of which exert a positive significance for rapid development of Chinese culture industry.

References

- [1] K. Sopian, W. Wan. Daud 2006 Challenges and future developments in proton exchange membrane fuel cells *Renewable Energy* **31** (5), 719-27
- [2] F. A. Olsen. Berenguer, M. G. Molina 2010 Design of improved fuel cell controller for distributed generation systems *International Journal of Hydrogen Energy* **35** (11), 5974-80
- [3] Ausilio. Bauen, David. Hart, Adam. Chase 2003 Fuel cells for distributed generation in developing countries-an analysis *International Journal of Hydrogen Energy* **28** (7), 695-701
- [4] T. Kaneko, J. Brouwer, G.S. Samuelsen 2006 Power and temperature control of fluctuating biomass gas fueled solid oxide fuel cell and micro gas turbine hybrid system *Journal of Power Sources* **160** (1), 316-25
- [5] Allag, T. Das. T 2012 Robust control of solid oxide fuel cell ultracapacitor hybrid system *IEEE Transactions on Control Systems Technology* **20** (1), 1-10
- [6] Li. Y. H, Rajakaruna. S, Choi. S. S 2007 Control of a solid oxide fuel cell power plant in a grid-connected system *IEEE Transactions on Energy Conversion* **22** (2) (2007) 405-13
- [7] Caisheng. Wang, Nehrir. M. H 2007 Short-time overloading capability and distributed generation applications of solid oxide fuel cells *IEEE Transactions on Energy Conversion* **22** (4), 898-906
- [8] Du. W, Wang. H. F, Zhang. X. F, Xiao. L. Y 2012 Effect of grid-connected solid oxide fuel cell power generation on power systems small-signal stability *IET Renewable Power Generation* **6** (1), 24-37
- [9] Saha. A. K, Chowdhury. S, Chowdhury. S. P, Song. Y. H 2007 Application of solid-oxide fuel cell in distributed power generation *IET Renewable Power Generation* **1**(4), 193-202

- [10] Vikram. M, M. J. Vinod, T. Steffen, D. Olaf 2012 A novel approach to model the transient behavior of solid-oxide fuel cell stacks *Journal of Power Sources* **214**(9), 227-38
- [11] Ito. Y, S. Kawauchi 1995 Microprocessor based robust digital control for UPS with three-phase PWM inverter *IEEE Transactions on Power Electronics* **10**(2), 196-204
- [12] Ilyas. E 2006 Sliding mode control with PID sliding surface and experimental application to an electromechanical plant *ISA Transactions* **45**(1), 109-18
- [13] Castaneda. C. E, Loukianov. A. G., Sanchez. E. N, Castillo-Toledo. B 2012 Discrete-time neural sliding-mode block control for a DC motor with controlled flux, *IEEE Transactions on Industrial Electronics* **59**(2), 1194-1207
- [14] Hassan. S, Seyyed. M. M. K, Gholamreza. V, Aria. A 2009 Stabilizing unstable fixed points of discrete chaotic systems via quasi-sliding mode method *Communications in Nonlinear Science and Numerical Simulation* **14**(3), 839-49
- [15] V. Utkin, J. Guldner, J. Shi 1999 *Sliding Mode Control in Electromechanical Systems* CRC Press: Boca Raton

Author



Xia Yidan, 1975.7.2, Hunan, China

Current position, grades: The doctoral; the lecturer of Hunan University of Commerce, Hunan, Changsha.

University studies: received her mater degree in Hunan University.

Scientific interest: Her research interest fields include culture industry and economic development.

Publications: more than 10 papers published.

Experience: Graduated from Hunan Normal University, Bachelor Degree of Geography Education in 1995; Graduated from Hunan University, Master Degree of Quantitative economics in 2007; now working in Hunan University of Commerce, with 7 years teaching experience.