An analysis of the impact of the US presidential election on the Sino-US economy

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Abstract: The United States has a presidential system, and presidential elections are held every four years. The American presidential election system is an electoral college system. According to the 22nd Amendment to the current U.S. Constitution, the term of office of the President of the United States is four years, which can be re-elected. The presidential candidates are Republican candidate Donald Trump and Democratic opponent Joe Biden. Because they come from different political parties, their ruling ideas are very different. This topic is to discuss the influence of American election. The two presidential candidates have different political positions and administrative plans on key issues such as national economy, immigration, education, etc. The election of different candidates and their different ruling styles and policies will affect different development models of the global economy. This will also have an impact on America's own economy.

1. Introduction

The trend of globalization is irreversible. Economic globalization, especially financial globalization, makes the economies of various countries depend on each other, influence each other and promote each other. Therefore, the result of the US election will not only affect the American economy, but also affect the Chinese economy. Based on the collected data, this paper quantitatively analyzes the different impacts of different candidates' elections on American economy and explores the different impacts of different candidates on Chinese economy.

Through data collection and investigation, as a typical political and economic system in the United States, the votes in the hands of voters represent the general trend and requirements of economic development at various stages. If the current economy is running well, the ruling party can continue to be in power, and the 20 policies of its economic team can continue [2].

2. Comprehensive evaluation index system model analysis

In order to evaluate the impact of different presidential candidates on American economy, we need to establish a comprehensive evaluation index system to evaluate the economic development of different policies. First of all, we collect the different policies of Trump and Biden in these fields [3], select the indicators directly affected by these policies, and get the policy indicators. Then, the indicators reflecting economic changes are selected as economic indicators, and a comprehensive evaluation index system is established.

The influence of the United States on China's economy is mainly determined by its trade policy with China. First, we choose GDP, national fiscal revenue and national housing economic index as economic indicators, and China-US trade status as policy indicators. Using cubic exponential smoothing forecast to forecast GDP, we can get the total import volume of China to the United States in the past five years and the impact of the US trade policy towards China on China's economy [4].

3. Comprehensive evaluation index system model analysis and construction

3.1 Quantitative indicators and policy comparison

The two presidential candidates have not yet started a new round of government work. The economic impact of their policies can not be fully used as the basis for data analysis, so it is necessary to consider the economic impact brought by similar ruling ideas in the past. For Republican presidential candidate Trump, most of his policy goals can be set from 2017 to 2020. For Democratic candidate Biden, it can be combined with the policies of the Obama administration. Collect the relevant industrial data and economic quantitative indicators of the same period [5].

According to the standardized formula:

$$X_{ij}^* = \frac{X_{ij} - \overline{X}_j}{\sigma_j} \tag{1}$$

$$\overline{X}_j = \frac{1}{n}\sum_{i=1}^{n} X_{ij} \tag{2}$$

$$\sigma_j^2 = \frac{1}{n-1}\sum_{i=1}^{n}\left(X_{ij} - \bar{X}_j\right)^2 \tag{3}$$

Standardize all data and eliminate the influence of dimensions. If the standard deviation is greater than 3, it will be judged as abnormal data. Replace abnormal data and missing data with the average value of the nearest point. The Democratic Party represented by Biden supports the New Deal liberalism, and advocates narrowing the gap between the rich and the poor and increasing government economic intervention. Emphasize freedom and efficiency, fair trade, limit government scale and government supervision, support tax reduction, oppose illegal immigration, lower social security level, and retain the right to hold guns. Different policy propositions may have different impacts on the economy [6]. Based on the political opinions of the two presidential candidates, this paper seeks the corresponding economic indicators to study the relationship between policy and economy.

3.2 Normal analysis test results

In this paper, energy index, GDP, investment in fixed assets, unemployment rate, import and export trade volume, industrial production index, medical index, education expenditure and disposable personal income are selected to reflect the changes of these economic indicators under the influence of different policies, and then the relationship between policies and economy is studied.

S1-S4: represent total energy output, crude oil output, natural gas output and hydropower output. These indicators are all descriptions of energy, which can reflect a country's energy reserves in a certain period of time.

M: That is to say, GDP refers to the value of all final products and services produced by the economy. A country or region is usually considered as the best index to measure the country's economic situation in a certain period of time (one quarter or one year). It can not only reflect a country's economic performance, but also reflect a country's national strength and wealth.

N: The amount of investment in fixed assets expressed in currency and the workload of construction and purchase of fixed assets. It is a comprehensive index reflecting the scale, speed, proportion and use direction of investment in fixed assets. It is an important basis for the state to formulate investment plans and control investment scale.

F: Unemployment rate refers to the number of unemployed persons who meet all employment conditions within a certain period of time. It aims to measure the ability of idle labor force, and it is the main index reflecting the unemployment situation of a country or region.

P: Said the total amount of import and export trade, that is, the total amount of goods actually entering and leaving a country's territory. The total import and export volume is used to observe the total scale of a country's foreign trade.

Check the results of normality test. Because of the small number of samples, according to the results of K-S, sig.=0.2 > 0.05, which obeys normal distribution. You can see that this is a central indicator, that is, the more central the indicator is, the better the economic situation is. Construct index p.

$$P' = \begin{cases} \dfrac{2(P-m)}{M-m} & m \le P \le \dfrac{M+m}{2} \\ \dfrac{2(m-P)}{M-m} & \dfrac{M+m}{2} < P \le M \\ m = \min P & M = \max P \end{cases} \tag{4}$$

H: Representing industrial production index is the physical index of industrial products compiled by weighted arithmetic average method. It is not only a commonly used index to calculate and reflect the speed of industrial development in western countries, but also the first choice for economic analysis.

E: Represents the health care cpi index, which refers to the government's investment in health care.

G: It indicates that education expenditure, that is, the amount of education in national fiscal expenditure, can reflect a country's investment in education. Represents the disposable personal income, which is the balance of personal income minus personal tax expenses.

R: It is a monetary amount that can be freely controlled by individual consumers or families, and is often used to measure the change of a country's living standard.

Because there are too many indicators to characterize energy status, principal component analysis is used to reduce variables. By calculating the principal component contribution rate of these four indexes, the linear expression of energy index is obtained, which can better reflect the energy situation.

$$S_{ij}^* = \frac{S_{ij} - \overline{S}_j}{S_i} \left(i = 1, 2, \cdots, n, \quad j = 1, 2, 3, 4 \right) \tag{5}$$

$$S_j^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left(S_{ij} - \overline{S}_j \right)^2 \quad \left(j = 1, 2, 3, 4 \right) \tag{6}$$

Contribution rate of principal components: $\dfrac{\lambda_i}{\sum_{k=1}^{p} \lambda_k} \left(i = 1, 2, \cdots, p \right)$

$$S' = \lambda_1 S_1 + \lambda_2 S_2 + \lambda_3 S_3 + \lambda_4 S_4 \tag{7}$$

Principal component analysis using SPSS software shows that the cumulative contribution rate is 89.54% when extracting principal components. Through the analysis, the eigenvalues are 0.994, 0.854, 0.979 and 0.951 respectively. So far, a comprehensive index system on Trump and Biden policies has been established.

$X = \{S', N, P', H, E, G, R\}$ It is a policy indicator, that is, an indicator that the state can directly

regulate and control through policies. $Y = \{M, F', R\}$ It is an economic indicator, which is

influenced by policy indicators and reflects the economic situation from different directions. Canonical correlation analysis of policy indicators and economic indicators. The correlation between the comprehensive variable pairs is used to reflect the overall correlation between the two groups of indicators.

It can be seen that the number of newly diagnosed patients has a great impact on the balance of import and export trade of medical CPI and the unemployment rate.This shows that the new type of coronavirus has a great impact on the import and export industry of the United States, resulting in the rise of unemployment rate in the United States and the sharp rise in the price of health care.The main steps of canonical correlation analysis are as follows

Extracting the comprehensive variable U: from X

$$U_i = a_1 S' + a_2 N + a_3 P' + a_4 H + a_5 E + a_6 G + a_7 R = a'X \tag{8}$$

Extract the synthesis variable V from the following expression:

$$V_i = b_1 M + b_2 F' + b_3 R = b'Y \tag{9}$$

The typical correlation coefficient was calculated

$$\rho(u, v) = \frac{\mathrm{cov}(U, V)}{\sqrt{Var(U)}\sqrt{Var(V)}} = \frac{a' \sum_{12} b}{\sqrt{a' \sum_{11}' a} \sqrt{b' \sum_{22}' b}} \tag{10}$$

The canonical correlation coefficients were calculated by SPSS software.Typical correlation

coefficients of set 1 are shown in the following table:

Table 1 Sets up a standardized canonical correlation coefficient

variable	1	2
Quarterly adjustment of US exports	-0.76	0.036
U.S. manufacturing, except for defense transportation	0．014	-0.07
CPI healthcare in the United States	0.384	0.172
Total fixed assets investment in the United States	-0.093	-1.412
Compared with the same period last year, the US trade balance was adjusted quarterly	0.003	0.016
Quarterly adjustment of average weekly salary in the United States	0.108	-1.839
Quarterly adjustment of US industrial output index	0.149	0.416
Education expenditure	-0.002	-0.028
total imports and exports	0.03	-0.064
revenue	-0.008	0
trade balance	0.507	2.475

Through the analysis, it is concluded that:
U1=-0.076, 0.014, 0.384, -0.093, 0.003, 0.108, 0.149, 0.002, 0.03, -0.008, 0.507
U2=0.036, -0.007, 0.172, -1.412, 0.016, -1.839, 0.416, -0.028, -0.064,0.00, 2.475

$$U_1 = -0.093N - 0.076P' + 0.149H + 0.384E - 0.002G$$

$$U_2 = -1.412N + 0.036P' + 0.416H + 0.172E - 0.028G$$

4. Model evaluation

From the above analysis, we can see that energy output has a great impact on GDP, and trade balance has a great relationship with personal income and unemployment rate.

Energy resources are indispensable resources for human survival, economic development and social progress, and are important strategic materials related to national economic lifeline and national defense security.Therefore, the energy policies of trump and Biden will have a significant impact on the GDP of the United States.

On the energy front, trump is a staunch defender of fossil energy, and to that end, all his actions have focused on removing barriers to coal, oil and gas production.In the coal industry, trump lifted the ban on new coal mines on federal land and relaxed carbon emission restrictions on the coal industry; in the oil industry, trump relaxed the restrictions on offshore oil development and approved the construction of oil pipelines.In the natural gas industry, trump relaxed restrictions on shale gas development and tried to promote the export of liquefied natural gas.While the output of oil and natural gas is increasing year by year, the market share of coal is getting lower and lower.

5. Conclusion

A comprehensive index system should be established to comprehensively evaluate the possible

impact of different U.S. president's response strategies, infrastructure, taxation, education and health care on the Sino US economy.This conclusion is based on the analysis of the relevant data of the United States, and the conclusion is comprehensive, objective and reliable.In order to make the analysis result more reasonable, the data are cleaned up in advance and the dimension is eliminated.

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