

Multi-index Evaluation and Analysis of the Impact of US Presidential Election on Economy Based on SPSS

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Abstract. The result of the US election in 2020 will affect the economic trend of the United States and China. Economy is an important indicator of people's living standards, and policies and principles guide economic development. Based on the relevant data, this paper quantitatively analyzes the possible impact of the two candidates on the American economy and the Chinese economy. Factor analysis and the global econometric model of the National Academy of Sciences are used to determine economic trends.

Keywords: SPSS, Factor Analysis, MATLAB, NIGEM.

1. Introduction

Since the global outbreak of the new crown virus, China, the United States, and even the global economy have been severely impacted. In today's economic globalization, the United States, as the only superpower in the world today, has its economy subtly affecting the world [1]. The US President's personal political ideals and administrative direction determine and dominate US policies, and US policies guide the future global economic development and human destiny.

2020 is the year of the US presidential election. Republican candidate Donald Trump and Democratic opponent Joe Biden are running for president. Although both Trump and Biden want to promote economic growth and reduce unemployment, their approaches are completely different. The election of different candidates will shape different strategic models of global economic and financial development and have a greater impact on the US and the global economies (including the Chinese economy). History and human destiny may be reversed at the moment of the presidential election. Therefore, objectively and comprehensively[2] analyzing the impact of the US president on the economy and discussing the future economic development of China and the United States is of great significance for achieving common prosperity and common development for all humanity.

2. Factor Analysis Method

The factor Analysis Method is a multivariate statistical analysis method that starts from studying the internal dependence of the variables, and reduces some variables with intricate relationships into a few comprehensive factors.

2.1. Basic Steps of Factor Analysis Method

First, confirm that you have the correct template for your paper size. This template has been tailored for output on the US letter paper size. If you are using A4-sized paper, please close this file and download the file for "MSW_A4_format".

(i) Confirm whether the original variables to be analyzed are suitable for factor analysis.

Construct factor variables.

Making factor variables more interpretable using rotation methods.

Calculate factor variable scores.

(ii) Calculation of factor analysis:

(1) Standardization of raw data to eliminate order of magnitude and dimensional differences between variables.

(2) A correlation matrix for standardized data;

(3) Find the eigenvalues and eigenvectors of the correlation matrix;

(4) Calculating variance contribution rate and cumulative variance contribution rate;

(5) Identification factors:

Let the $F_1, F_2, \dots, F_p$ be p factors, where the total amount of data information contained in the first m factors (that is, its cumulative contribution rate) is not less than 80, the first m factors should be taken to reflect the original evaluation index;

(6) Factor rotation:

If the m factors obtained can not be determined or their practical significance is not apparent, it is necessary to rotate the factors to obtain a more obvious practical meaning.

(7) Use the linear combination of the original indicators to find the score of each factor:

Regression estimation, Bartlett estimation, or Thomson estimation are used to calculate factor scores.

(8) Composite score

Based on the variance contribution rate of each factor, the comprehensive evaluation index function is obtained from the linear combination of each factor.

$$F = (w_1F_1 + w_2F_2 + \dots + w_mF_m) / (w_1^2 + w_2^2 + \dots + w_m^2)$$

Here w_i the variance contribution rate of the factor before or after rotation.

(9) Score ranking: score ranking can be obtained by using comprehensive scores.

2.2. Key factors extraction by Factor Analysis

Principal component extraction was performed on the factors affecting the economy [3], and the matrix was obtained by factor analysis using SPSS software (Figure 1).

relevant matrix											
	GDP(2010 annual constant (USD)	Inflation by consumer price index (annual growth rate)	Employment	Medium US Housing Prices	Total residential and residential buildings by stage of construction started	NAICS	Total construction expenditure	Industrial production: total index	Total retail sales	USAPFCEQ DSMEI	
GDP(2010 annual constant (USD)	1	-0.509	0.983	0.979	-0.243	0.919	0.934	0.944	0.995	0.99	
Inflation by consumer price index (annual growth rate)	-0.509	1	-0.468	-0.459	0.239	-0.42	-0.411	-0.447	-0.498	-0.505	
Employment	0.983	-0.468	1	0.961	-0.106	0.947	0.974	0.967	0.975	0.959	
Medium US Housing Prices	0.979	-0.459	0.961	1	-0.216	0.86	0.932	0.893	0.987	0.984	
Total residential and residential buildings by stage of construction started	-0.243	0.239	-0.106	-0.216	1	0.009	0.047	-0.02	-0.255	-0.327	
NAICS	0.919	-0.42	0.947	0.86	0.009	1	0.92	0.995	0.891	0.858	
Total construction expenditure	0.934	-0.411	0.974	0.932	0.047	0.92	1	0.932	0.925	0.902	
Industrial production: total index	0.944	-0.447	0.967	0.893	-0.02	0.995	0.932	1	0.923	0.892	
Total retail sales	0.995	-0.498	0.975	0.987	-0.255	0.891	0.925	0.923	1	0.996	
USAPFCEQ DSMEI	0.99	-0.505	0.959	0.984	-0.327	0.858	0.902	0.892	0.996	1	

a. factor of determination = 2.79E-016

Figure 1. Relevant matrix

From the point of view of population change trend, this paper selects GDP, industrial production, inflation, housing construction, manufacturing demand, employment figures, consumer expenditure, housing sales, construction expenditure, and retail sales as independent variables(Figure 2). Using correlation analysis, we know that some independent variables have low correlation, which leads to redundancy of variables, so we need to screen variables. By analyzing the composition matrix, it is found that GDP, four indexes of American employment level, housing sales, and industrial manufacturing significantly impact the economy. Therefore, the above four indicators can be used as a key factor affecting the economy (Table 1).

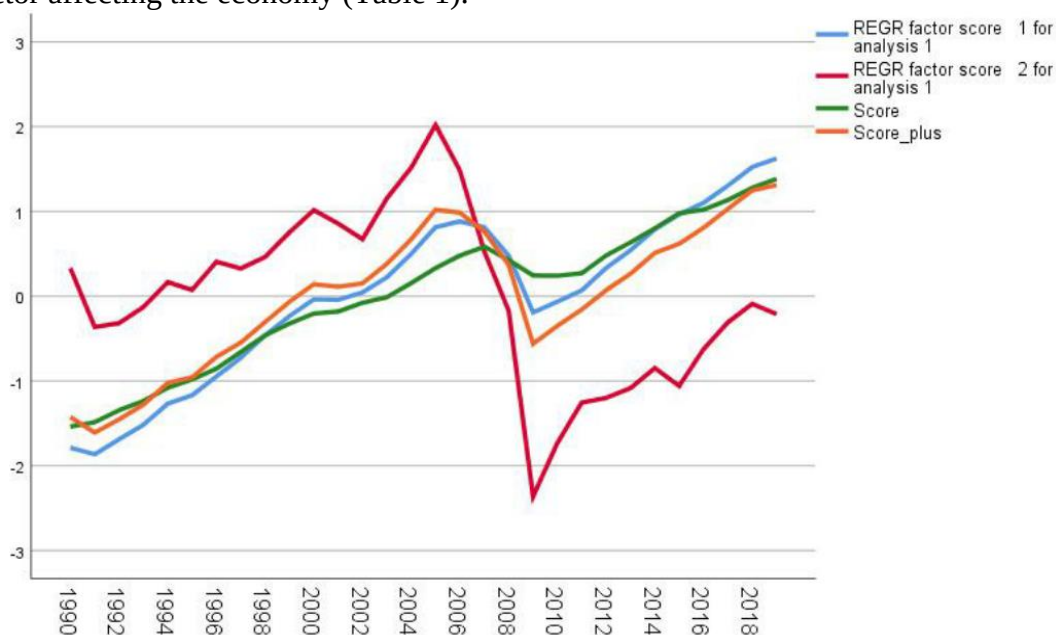


Figure 2. Index situation

Table. 1. Trump and Biden Policy Comparison

	Donald Trump on key issues	Donald Trump on key issues
labour market	Measures that have been rolled back include liability for salary violations and disclosure requirements for payment rights.	Support the expansion of trade union rights and the capacity of the Federal Government to impose fines on employers who violate labour.
tax policy	Support additional tax cuts and increase tax incentives, such as the "opportunity area" program.	Support for tax increases, including raising the corporate tax rate to 28% and raising taxes on high-income households. Support cuts in low-income people.
trade	The continuation of long-term policies has increased tensions with China and pushed for changes in the WTO to benefit U.S. trade policy.	Support the "purchase of American goods" policy. It could cut tariffs set by the Trump administration and put pressure on China through multilateral action.
2019 coronavirus pandemic	played down the severity of the Covid-19 and questioned the effectiveness of preventive measures such as masks. When the pandemic began, the United States withdrew from the World Health Organization.	Support for a coordinated response to the pandemic, including encouraging people to wear masks and rejoin the World Health Organization.

3. Analysis of the Impact Of the new crown virus on the U.S. economy

The impact of the new coronavirus on the US economy. In the face of the new crown virus, Trump and Biden have different policies. On the problem of whether to support the nationwide mask mission to fight the new crown pandemic, Trump opposed [4] the national requirement for masks and left it to state or local governments to issue authorization, although the Federal Strategic National Reserve is providing some Masks.

Sometimes Trump complains that extensive testing "makes us look bad" by increasing the number of known cases. Biden stated that he will adopt nationwide testing and contact tracing, including doubling the number of driving through test sites and providing federal funds for "regular and reliable covid-19 testing for every employee who is called back." Different policies on the new coronavirus will also have different effects on the US economy. In order to study these effects, we collected data on the proportion of GDP in the United States, and drew a pie chart of the proportions of each component (Figure 3).

constituent	proportion
consumption	68
Residential investment	4.3
Non-residential investment	13.1
government expenditures	18
export	9.8
import	13.3

Figure 3. The proportion of GDP in the United States

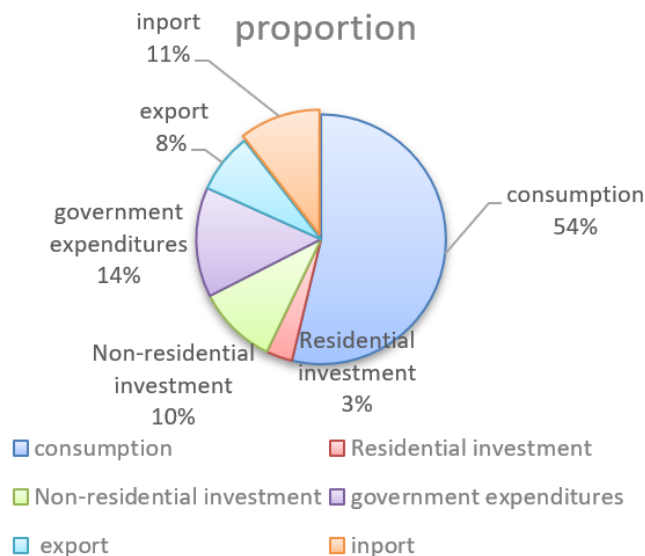


Figure 4. The proportions of each component

From the above analysis (Figure 4), we find that nearly 70% of the gross domestic product of the United States is consumption, which accounts for a large part of the gross domestic product of the United States.

The resilience of the United States economy in the next few quarters depends mainly on nearly 70% GDP consumer spending in the United States. However, consumer consumption levels and labor markets have been closely linked over the past decade. As the labor market continues to deteriorate, the impact of the income effect has led to a sharp deterioration in the consumer confidence index. To this end, we collected consumer index data since the outbreak in the United States and mapped the consumer confidence index over time (Figure 5).

TIME	Consumer confidence index
20-Jan	99.8
20-Feb	101
20-Mar	89.1
20-Apr	71.8
20-May	72.3
20-Jun	78.1
20-Jul	72.5
20-Aug	74.1
20-Sep	80.4
20-Oct	81.8

Figure 5. Consumer confidence index

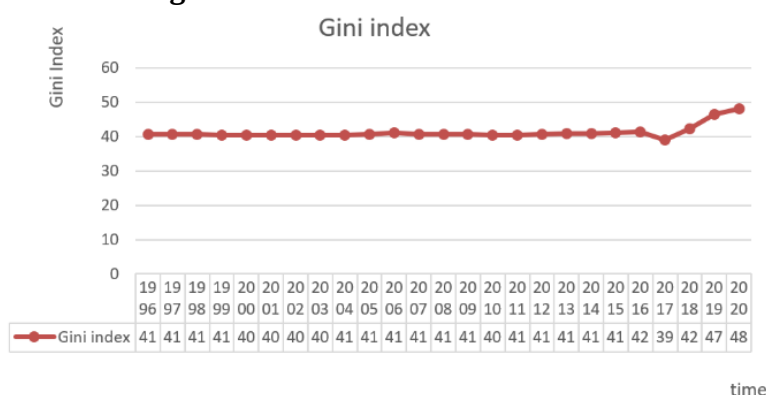


Figure 6. Gini index

It can be seen that the Gini index in the United States has been fluctuating at a relatively low level before the outbreak in the United States in 2020, which is also closely related to Trump's policy on the new crown epidemic. The epidemic also had a huge impact on corporate confidence (Figure 6).

4. Analysis of the Impact of taxes on the U.S. economy

Total tax revenue under trump tax policy is estimated to decrease by \$1% on average in 2021-2030, bn; 700 (Forecast from CBRF), Biden tax policy is expected to increase by a total of 4 percent on average \$2021-2030, 300 bn. We assume that the increased taxes in this decade are evenly distributed among the increased/decreased taxes each year. Thus, the tax revenue in ten years is predicted.

Estimates from CBRF(Figure 7), the average trump 'Enact "Made in America" and Insourcing Tax Breaks' and Allow 100%Expensing for Essential industries' policy would be reduced by bn,400 biden's tax-increase policy for companies increases \$1% on average, 800 bn. About 20% of U.S. GDP are industrial. Although the two tax policies are almost completely opposite, they can improve the level of the national economy in a long period of development. For Biden, the income at the disposal of individual citizens will not increase significantly in the past five years, but will rise rapidly in 2025. As far as Trump is concerned, the promotion of the national economy will be gradually delayed.

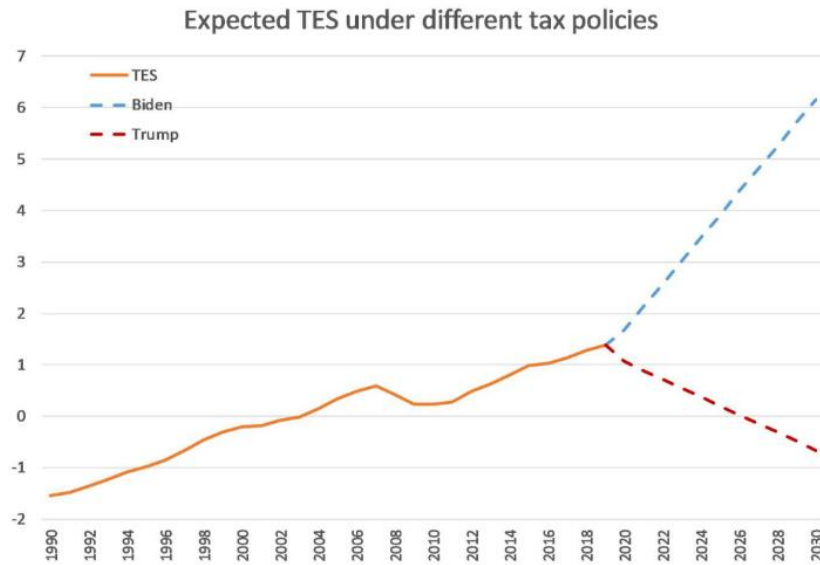


Figure 7. Expected TES under different tax policies

5. Analysis on the Impact of Labor Market on American

For this field, the unemployment rate and the actual per capita disposable income (RPDI) index are selected for analysis (Figure 8). An analysis of the unemployment rate in the United States from 1960 to 2019 shows that unemployment tends to surge in the face of major crises, but there are signs. For the new crown virus epidemic, we predict that unemployment in the United States will rise again in the fourth quarter of 2020. After that, the NiGEM model was used to predict the unemployment rate for the following ten years, which required three indicators, the total population in the working age, the labor participation rate and the total number of employees. The forecast value of three indicators in ten years (attached) is obtained by using time series prediction, and the unemployment rate is calculated by using the forecast value (Figure 9).

$$U_t = \frac{(pop_t^{wa} \times prt_t) - e_t}{pop_t^{wa} \times prt_t} \quad (1)$$

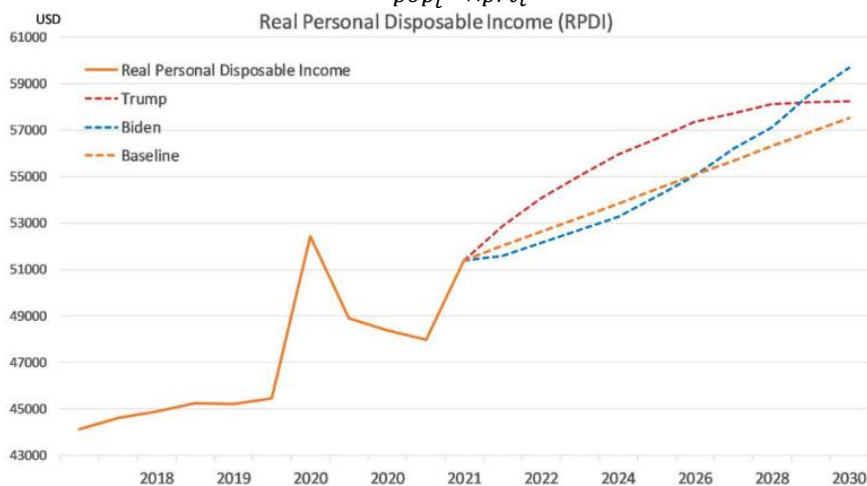


Figure 8. RPDI value

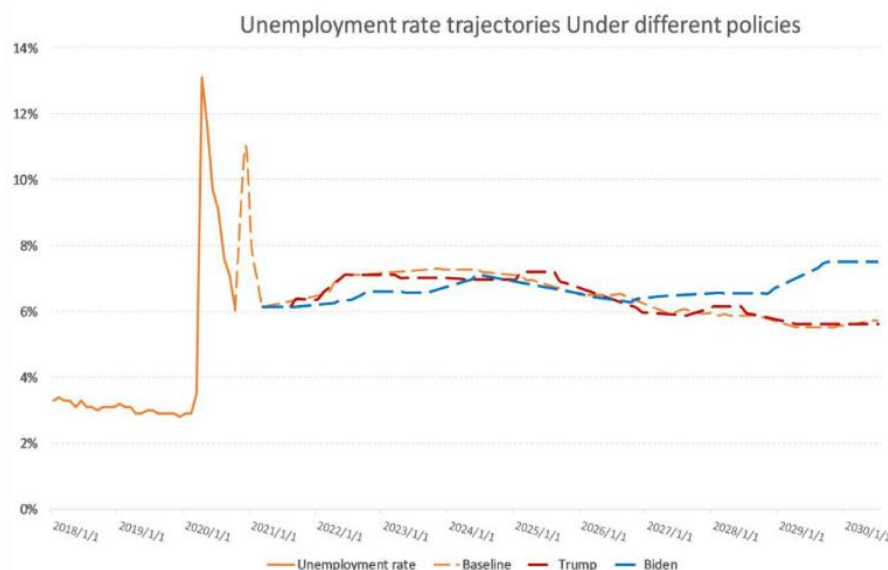


Figure 9. Unemployment chart

As the COVID-19, the unemployment rate soared to an unprecedented 14.7 percent after the Second World War in April 2020. Although we have seen a rapid fall to 7% in the third quarter, we expect unemployment to rise again in the fourth quarter. In the short term, Biden's package pushed unemployment below our benchmark. The positive impact of increased government spending on employment is greater than the negative impact of increased minimum wages. In the median estimate of the Congressional Budget Office, raising the minimum wage to \$15 would cause 1.3 million workers to lose their jobs. As positive spending effects begin to fade away, unemployment will stabilize and be expected to recover towards a balanced unemployment rate in the mid-decade. This is partly related to higher corporate taxes and increased labour-saving technological changes at the expense of structural employment. There is no impact of the latter in the Trump scenario, which leads to unemployment equal to our benchmark, even slightly below the benchmark level in the long run.

Through pre-analysis, we can see that the actual per capita disposable income has a strong linear relationship with our comprehensive economic score (Comprehensive Economy Score), so we use RPDI to analyze the CES.

RPDI projections over a decade: the middle-class income tax rate fell from 22% to 15%, and under the Biden policy, the company will increase the company's tax, and the upper limit of personal income tax increased from 37% to 39.6%. Therefore, in terms of tax, Trump and Biden have adopted the opposite policy, and the impact of actual disposable income is also developed in the opposite direction. Due to the Trump Government's tax cuts, the actual personal disposable income after the crisis reached 47% this year, rapidly increased from \$ 994 to about 56% (\$ 2025653), more than \$ 195 than our baseline 2 USD. Because Biden leverages higher tax, it is impossible to increase the impact of minimum wages, and therefore, we estimate that by 2025, Personal income will be lower than our benchmark scenario.

But as the impact of tax policy began to weaken, it was linked to Biden's progrowth productivity policy. In the Biden scenario, we can get that real personal disposable income will increase rapidly after 2025. In Trump's case, real personal income growth slowed to about 0.1% a year after 2026. Ultimately, Trump and Biden's policy package led to a higher real disposable income than the benchmark in 2030. For Trump, it will be around 2.48%, and for Biden, we expect it to be within 3.76%.

Estimate the CES using regression analysis to obtain the following data and graphs(Figure 10).

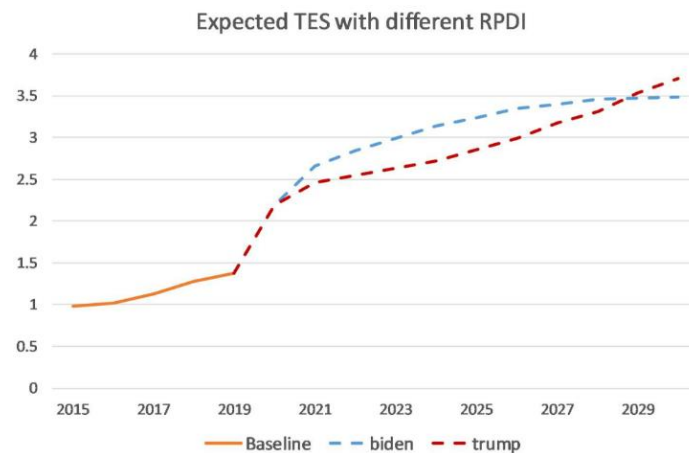


Figure 10. Expected TES with different RPDI

6. Conclusion

As the 2020 US election results will affect the economic trend of the United States and China, this paper uses relevant data to quantitatively analyze the possible impact of the two candidates on the US economy and China's economy, and draw relevant conclusions.

Acknowledgements

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