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Analysis of the Economic Impact of the US Presidential Candidates on the United States and China

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Abstract: Given that the United States has tremendous influence on the world economy, as Georgios Georgiadis pointed in his paper: Spillovers are generally large, often larger than the domestic effects in the US, it makes economic sense to anticipate the economic impact of different election outcomes on both China and the United States, and get prepared. In this essay, we determine the multiple linear regression equation and get the final index system, with which the impact of different election results on the U.S. economy can be predicted. According to the conclusion and the data collected and known that the impacts of the pandemic on regional economies vary significantly, we analyze the impacts of the two scenarios of President trump and President Biden on China's economic development, which might contribute to further practical suggestions.

1. Introduction

Assuming that the policies' impacts on the US economy are mainly reflected in the macroeconomic impacts of anti-COVID-19 policies[1]. The impacts of immigration policies, the environmental protection and other factors are not included in the consideration for the time being[2].

The change of social consumption level is mainly measured by four indicators, namely, CPI%, IBD%, DPI% and CE%; the change of social investment level is mainly measured by two indicators: Inv% and PSI%; the change of foreign trade level is mainly measured by two indicators: OilExp% and TradeDeficits%.

Assuming that there is no economic crisis in recent years in both countries.

Assuming that the data source is reliable and accurate.

Ignoring random errors, all the errors mentioned in this paper are systematic errors.

2. Analysis of the Influence Factors of Us Presidential Election Results on American Economy Based on Multiple Linear Regression Model

2.1 Data Pre-Processing

As Biden served as vice President from the end of 2008 to early 2017, we take data from 2009 to 2016 to analyze the economic influence of Biden. Donald Trump was sworn in as President of the United States on January 20, 2017, hence we choose data from 2017 to 2020 to analyze Trump's.

- We record monthly CPI data and calculate the arithmetic mean of every 3 monthly CPI as quarterly CPI. We subtract the last quarterly data from the current quarterly data and divide the difference by the last quarterly data to get the quotient as the quarter-on-quarter CPI growth. We do all the same to our data then get all the quarter-on-quarter growth of economic optimism index, DPI, private sector lending, oil export, unemployment rate.
- For quarterly GDP growth we record all quarterly data down online.
- For quarterly consumption expenditure, direct investment, trade deficits, we record quarterly data online, then subtract the last data from the current data and divide the difference by the last data to get the quarter on quarter growth of them.

2.2 Model Establishment

1) Establishment of preliminary index system

Based on the data, we select the following indicators, shows in Figure 1 :

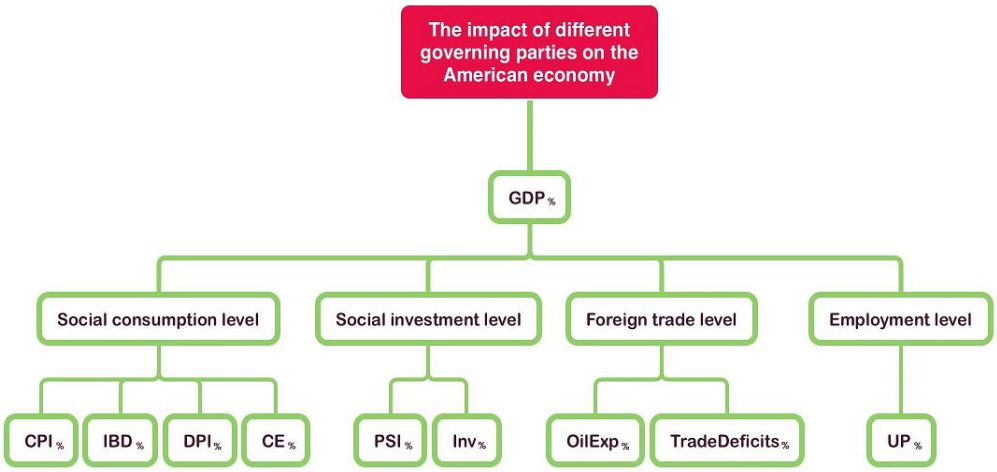

Figure 1: Preliminary Index System

2) Multiple linear regression equation

We use GDP% as the dependent variable as a macro indicator to measure the overall US economy. Other small indicators were taken as independent variables. We use R language to fit multiple linear regression model, and the code has been listed in the appendix at the end of the article(Table 1).

Table 1: Results of the First Fitting Model

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	0.7295	0.4295	1.699	0.09802	·
OilExp%	-0.1438	0.7158	-0.201	0.84191	
Trade deficts	0.3773	0.4544	0.830	0.41181	
CPI	-26.6082	52.0207	-0.511	0.61213	
DPI	42.9496	21.3490	2.012	0.05177	·
IBD	-5.7784	3.6144	-1.599	0.11863	
CE	172.6382	22.8307	7.562	6.le-09	* * *
Inv	3.0537	1.0607	2.879	0.00668	* *
PSI	4.0013	1.8583	2.153	0.03808	*
UP	0.2571	0.3804	0.676	0.50345	
Residual standard error: 1.249 on 36 degrees of freedom Multiple R-squared: 0.7556, Adjusted R-squared:0.6945					
F-statistic: 12.37 on 9 and 36 DF, p-value: 1.235e-08					

3) Analysis of the first fitted model:

It can be seen from the output that the Adjusted R^2 is 0.6945, so the fitting degree of the model needs to be improved. Moreover, when $\alpha = 0.05$, the influence of some independent variables such as CPI% and Trade defaults is not significant. Consequently, we use stepwise regression method to further screen independent variables. The results of stepwise regression are as follows(Table 2):

Table 2: the Results of Stepwise Regression

(Intercept)	DPI	IBD	CE	Inv	PSI
0.7641	35.6846	-4.3664	161.9747	3.3287	3.9548

In the first screening, the selected variables were DPI%, IBD%, CE%, Inv% and PSI% (Table 3).

Table 3: Results of the Stepwise Regression

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	0.7641	0.3062	2.495	0.01682	*
DPI	35.6846	17.6385	2.023	0.04978	*
IBD	-4.3664	3.0918	-1.412	0.16561	
CE	161.9747	19.5978	8.265	3.47e-10	* * *
Inv	3.3287	0.9467	3.516	0.00111	* *
PSI	3.9548	1.7876	2.212	0.03272	*
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Residual standard error: 1.209 on 40 degrees of freedom					
Multipe R-squared: 0.7454, Adjusted R-squared: 0.7136					
F-statistic: 23.43 on 5 and 40 DF, p-value: 6.346e-11					

Although now the model is relatively good, we artificially add the indicators UP% and OilExp% to establish the final multiple linear regression model in order to make the index system more comprehensive.

The results of final model are as table 4. The fitting level of the equation is not as high as the previous one, but only slightly reduced. The fitting degree of the equation is 0.749, and the adjusted R^2 is higher than 0.7. Considering the complexity of practical factors, the equation fits well.

Table 4: Results of the Final Fitting Model

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	0.6907	0.3325	2.078	0.04455	*
DPI	40.3531	19.0836	2.115	0.04109	*
IBD	-5.1075	3.3138	-1.541	0.13153	
CE	167.9805	21.9499	7.653	3.27e-09	* * *
Inv	3.1757	1.0256	3.096	0.00367	* *
PSI	3.9671	1.8248	2.174	0.03601	*
OilExp%	-0.1528	0.6279	-0.243	0.80906	
UP	0.2540	0.3557	0.714	0.47957	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Residual standard error: 1.232 on 38 degrees of freedom					
Multiple R-Squared: 0.749, Adjusted R-squared: 0.7027					
F-statistic: 16.2 on 7 and 38 DF, p-value: 1.174e-09					

4) Test of the final fitting equation

- Significance Test of Regression Equation

It can be seen from the above table that the P value of the significance test of the regression equation is close to 0. Verification of the significance test of the regression equation was successful.

- Significance Test of Each Coefficient

Except the factors that we added manually to cover a wider range of macro economy, most of the factors have P value lower than 0.05, which can be considered as significant to a certain extent.

● Normal Distribution Test

We use Q-Q chart to test the normality. From Figure 2, we can see that almost all the points are near the straight line and fall within the confidence interval, which shows that the normal hypothesis is in perfect agreement.

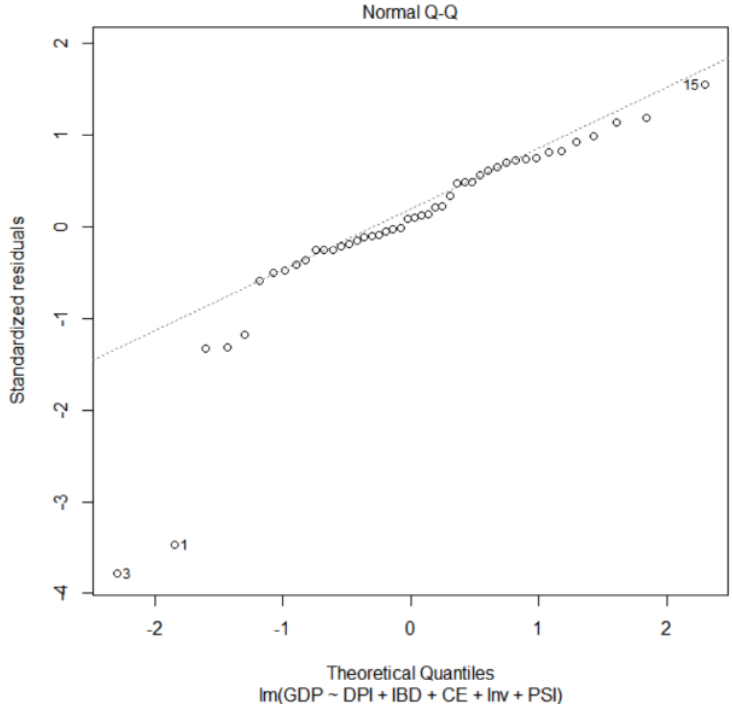

Figure 2: Normal q-q

5) Series correlation test, Table 5

Table 5: Lag Autocorrelation d-W Statistic P-Value

1	0.08140502	1.556538	0.174

Alternative hypothesis: rho != 0

P = 0.072 > 0.05, indicating that the dependent variables have no series correlation and are independent of each other.

6) Test for uniform variance, Table 6

Table 6: Non-Constant Variance Score Test

Variance formula: ~ fitted.values
Chisquare = 0.7962797, Df = 1, p = 0.37221

P = 0.37221 > 0.05, indicating that the error variance is constant.

To sum up, the model fits well and passes the test, which means it is suitable for prediction analysis.

2.3 Comprehensive Conclusions

The final fitting model includes seven indicators to measure the macro-economic changes, namely: IBD%, DPI%, CE%, PSI%, Inv%, OilExp% and UP%, The Final Index System shows in Figure 3.

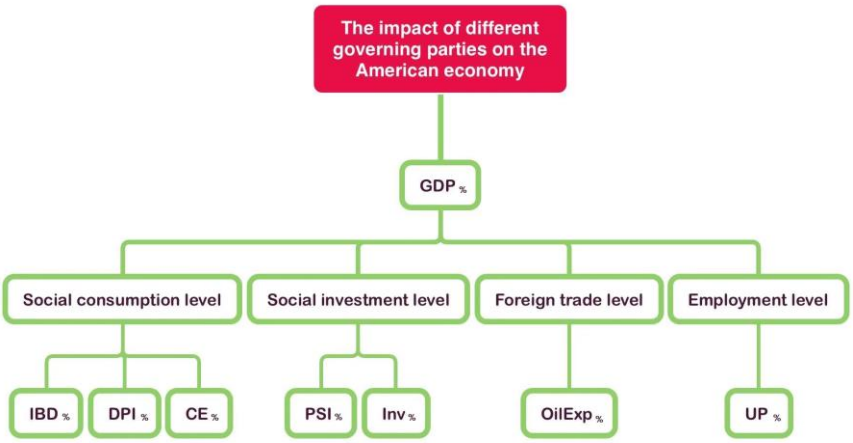

Figure 3: The Final Index System

The fitting formula is:

$$Lm = 0.6907 + 40.3531DPI_{\%} - 5.1075IBD_{\%} + 167.9805CE_{\%} + 3.9671PSI_{\%} - 0.1528Oil_{\%} + 0.254UP_{\%}$$

From the significance coefficients in Table 4, we can conclude that CE% has the greatest impact on GDP%, followed by Inv%. Together with other indicators, they can be used to measure macroeconomic conditions.

3. Possible Impact of Different Results

3.1 If Biden Wins the Election:

We predict that if Biden comes to power, the disposable income of American people will not change much from that of Trump's period, but the consumption expenditure will be more stable. Moreover, the inflation rate will be less than that of Trump's period. We believe that his administration will br more beneficial to the middle and low-level people, thus laying a solid foundation for the economic development of the United States. However, knowing that the US tightening monetary policy will have a certain degree of negative impact on China's economy[3], this result might not be a good news to Chinese people.

3.2 If Trump Wins the Election

If Trump take office, it will ease the situation of the growing trade deficit of the United States. We believe that his policies will give a strong boost to the American economy and stabilize it at a higher level for a long time. In addition, due to his tendency towards economic development, the oil price may also tend to increase. If he continues to be president, the American people will be more optimistic about the US dollar and more confident in the American economy.

4. Future Work

Researchers can include more indicators and select several indicators with real significant impact at last as explanatory variables of the model to establish a more effective and more precise multiple linear regression model.

In regard to question two, researchers can consider exploring the impact on other areas of China's economy, so as to give more comprehensive and reliable conclusions and suggestions.

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