

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

Qian Wang

Yunnan University of Finance and Economics Yunnan Province 650221, China

1286929342@qq.com

Abstract. The year 2020 is the year of the US presidential election, with both candidates focusing on key development areas such as finance and trade, economic and financial governance. Different candidates will shape different global economic and financial development strategies that will have a greater impact on the U.S. economy and the global economy, including China's. China-us relations have become the focus of the world's attention. We collected data for both China and the US (2002-2019) based on data regression and prediction. Besides, the model of random forest and support vector machine is established to analyze the relationship between various data to help us solve the problem and to think about the impact of different candidates' election on the Chinese and American economies. The clearer the data relationship is, the more accurate our conclusions will be. This paper looks up the relevant data and selects the features through stepwise regression, and uses the final retained features in SVM model to fit the relationship between various measures and economic development, and finally makes prediction. This paper establishes a BP neural network model to fit China's economic development data with the quantitative data of the relevant measures of the president of the United States, and finally realize the prediction of China's economic development. based on the results of the previous two questions, this paper compares Biden's and Trump's policies towards China, and gives relevant suggestions.

Keywords: stepwise regression; SVM; BP neural network.

1. Introduction

TSince the Second World War, great changes have taken place in the world pattern. The electoral system is an important part of American political system, and election is one of the most important political landscapes in the United States. Chl; ina and the United States are two major powers in the world. Sino US relations have become the focus of the world's attention, and even the "China topic" has repeatedly appeared in the US election to win attention. Different from the "China topic" before and after the cold war, the "China topic" in recent years has been more and more inclined to the economic topic. Whether the economic policies of the American candidates can meet the needs of the people has often become the key factor to win the election in recent years. Whether or not to take the American people out of the economic depression is only one of the reasons to mention the "China topic". The more important reason is that the United States itself will How to deal with the rise of China and its challenge to America's global dominance. This also reflects from the side that through decades of reform and opening up, China's economic and military strength has been greatly improved, narrowing the power gap between China and the United States. At present, China has become an economic superpower and an important force in the world political pattern. This has led to structural changes in bilateral relations. Economic trade and regional security have become the most intense areas of strategic game between the United States and China. The US presidential election is held every four years. 2020 is the year of the U.S. presidential election, with Republican candidate Donald Trump and Democratic rival Joe Biden running for president. Candidates from both sides are in finance and trade, economic and financial governance and other key development areas (e.g. covid19 combat measures, infrastructure, taxation, environmental protection, health insurance, employment, trade, immigration, education, etc.). Electing different candidates will shape different strategic models of global economic and financial development, and will have a greater impact on the U.S. economy and the global economy, including China's economy.

2. Feature selection based on stepwise regression

The distribution characteristics of each index are shown in the figure below:

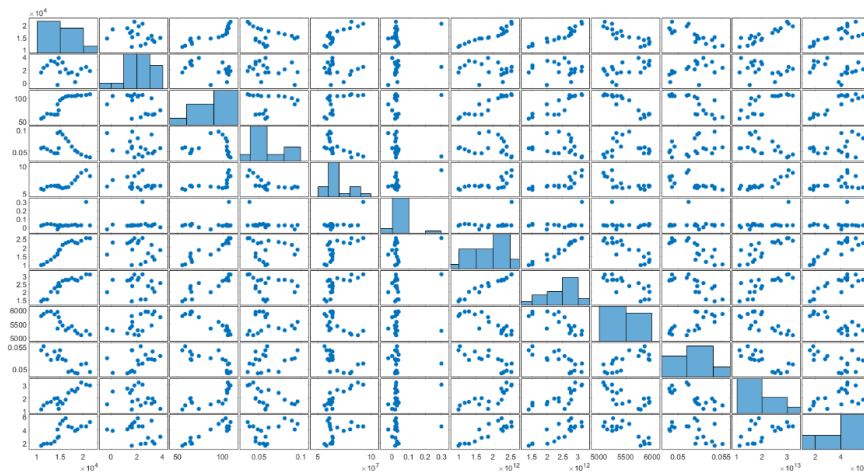


Fig. 1 Scatter matrix

Regression is a statistical method that allows us to understand the relationship between independent variables and dependent variables. Stepwise regression is a process of selecting variables in regression analysis. We can use stepwise regression to build regression model from a group of candidate variables, so that the system can automatically identify influential variables. The basic idea of stepwise regression is to introduce variables into the model one by one. After introducing an explanatory variable, F-test should be conducted, and t-test should be conducted for the selected explanatory variables one by one. When the original explanatory variables become no longer significant due to the introduction of later explanatory variables, they will be deleted. To ensure that only significant variables are included in the regression equation before each new variable is introduced. This is a repeated process until no significant explanatory variable is selected into the regression equation, and no insignificant explanatory variable is removed from the regression equation. To ensure that the final set of explanatory variables is optimal:

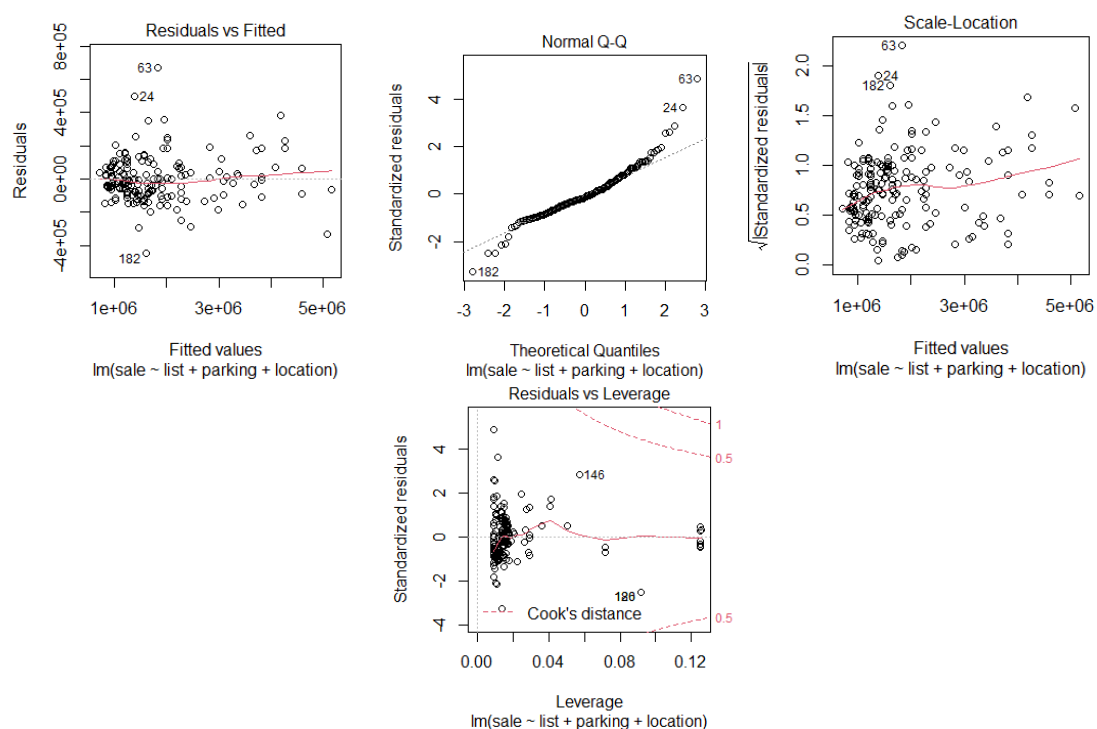


Fig. 2 Stepwise regression results

3. Support vector machine

Support vector machine (SVM) is originally a binary classification model. Its basic model is the linear classifier with the largest interval defined in the feature space, which makes it different from the perceptron; SVM also includes kernel techniques, which makes it a nonlinear classifier in essence. The learning strategy of SVM is to maximize the interval, which can be formalized as a convex quadratic programming problem, which is equivalent to the minimization of the regularized hinge loss function. The learning algorithm of SVM is the optimization algorithm to solve convex quadratic programming.

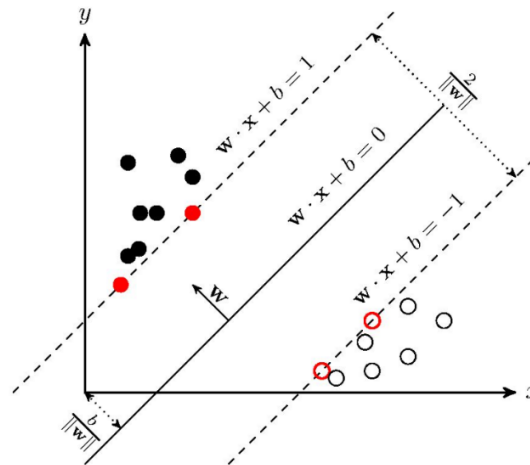


Fig. 3 Support vector machine schematic

As shown in the figure: the black line is the hyperplane, and the red dot is the support vector. The so-called support vector is the point closest to the hyperplane. The meaning of support vector machine is to make the distance between the hyperplane and the support vector as large as possible, which can be understood as the maximum minimum distance.

Firstly, the geometric interval is defined, that is, the distance between any data set and any hyperplane:

$$\gamma_i = y_i \left(\frac{w}{\|w\|} \cdot x_i + \frac{b}{\|w\|} \right)$$

Then the Lagrange multiplier method is used to construct the optimization function:

$$L(w, b, a) = \frac{1}{2} \|w\|^2 - \sum_{i=1}^N a_i (y_i (w \cdot x_i + b) - 1)$$

Then we ordered:

$$\theta(w) = \max_{a_i > 0} L(w, b, a)$$

Then we get the new objective function:

$$\theta(w) = \begin{cases} \frac{1}{2} \|w\|^2, & x \in \text{Feasible area} \\ \infty, & x \in \text{Infeasible area} \end{cases}$$

So the original constraint problem is equivalent to:

$$\min_{w, b} \theta(w) = \min_{w, b} \max_{a_i > 0} L(w, b, a) = p^*$$

This is essentially a convex optimization problem, which is brought into Lagrange objective function:

$$\min_{w, b} L(w, b, a) = -\frac{1}{2} \sum_{i=1}^N \sum_{j=1}^N a_i a_j y_i y_j (x_i \cdot x_j) + \sum_{i=1}^N a_i$$

For such a dual problem:

$$\max_a -\frac{1}{2} \sum_{i=1}^N \sum_{j=1}^N a_i a_j y_i y_j (x_i \cdot x_j) + \sum_{i=1}^N a_i$$

In the end:

$$w^* = \sum_{i=1}^N a_i^* y_i x_i$$

$$b^* = y_j - \sum_{i=1}^N a_i^* y_i (x_i \cdot x_j)$$

The corresponding sample point is located on the boundary of the maximum interval, which is a support vector. This shows an important property of support vector machine: after training, most of the training samples do not need to be retained, and the final model is only related to support vector.

4. Model test

SVM model prediction results are shown in the figure below:

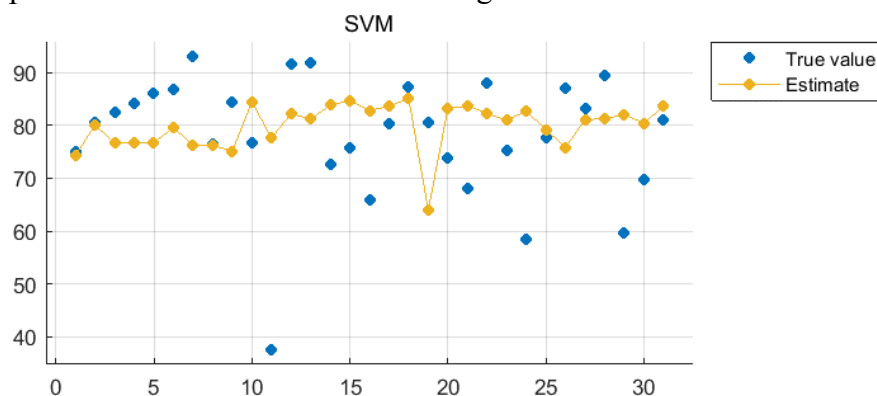


Figure 4. Fitting results

In the above figure, the blue scatter points indicate the actual value of economic development, and the Yellow straight line represents the predicted value of economic development. The actual value is evenly distributed on both sides of the predicted value, which is close to the predicted value, indicating that the fitting effect of the model is good.

5. Optimization model strategy

From a series of Biden's propositions, we can see that there is little mention of foreign problems, almost all of them are to solve the internal contradictions of the United States, and its starting point is more than that of the aggressive trump win. All Trump's propositions are about his achievements in the past four years, and he has no plan for the future, while Biden basically has an outline for the future. But there is one thing in common: they are attacking each other. Trump is attacking Obama, Biden is attacking trump. This does not mean that China's pressure will be reduced, but that China's pressure will change its position.

Since Biden's "instrumentalist" status, it will better implement the political views of the Democratic Party. After Biden's election, China will face the following problems:

First, when the trade issue is the one, Biden will definitely re-establish a TPP. In fact, there are already such calls in the United States. Biden does not necessarily call this new trade situation TPP, but the content will roughly repeat the TPP If China is under the heavy pressure of US trade sanctions today, the US sanctions will be reduced in the future, but the trade pressure of other countries on China will increase. How to deal with this problem in the future?

Second, Biden may unite with other countries to further pressure China politically. At present, Trump's China policy seems to be severe, but it also messes up foreign relations. In addition, a series

of Trump's appointments are unqualified. For example, the U.S. ambassador to Germany completely messed up the diplomatic relations with Germany, and German politicians hate trump to the bone, even though the United States oppresses China. The EU's China policy has been in a wait-and-see situation, and few countries have explicitly responded to trump's views. Moreover, trump did not form a clear program for China. He always felt that "where he goes is where he goes". On the eve of his visit to Britain these days, pompeio said that China is "imperialism", which is more humorous. In front of the world's largest imperialism, he accused a developing country of "imperialism". Obviously, his mind was a bit muddled, but it can be understood that, Bi It's a standard way for a CIA founder to do foreign affairs without considering the sensitivity of the place to go.

Third, the economic pressure on China has been reduced, but the political pressure has increased. From the beginning of Sino US trade frictions to today, the tariff of the United States has been increased, but the return of manufacturing industry has not seen results so far. After taking office, Biden will certainly trade with China in the name of lifting trade sanctions. Although this kind of cancellation is almost meaningless to China, the more meaningless things are, the more suitable they are.

The fourth is the political and economic encirclement of China. Trump wants to do it, but it is difficult, especially in the increasingly fierce conflict between Japan and South Korea during this period. The United States has almost stayed out of the way and has no good status as a adjudicator. In addition, Japan and South Korea may not be able to trust trump because of its endless demand for military expenditure in Japan and South Korea. It is very obvious that Japan occupied both sides at this time: on the one hand, Japan agreed with the United States on the Hong Kong issue; on the other hand, it stopped the deployment of "land-based Aegis system". According to otaro Kono, the reason is that "considering the cost and deployment period, and the current technical level, it is impossible to ensure that the anti missile segment does not fall into residential areas". I personally feel that this excuse is rather clumsy.

The fifth point is that trump is quite contemptuous of the United Nations at present. China has made progress in many international organizations and has obtained the support of many international organizations. After the Democratic Party takes office, it will inevitably begin to return to international organizations on a large scale and compete for the right to speak. From the result, after Biden came to power, the US foreign policy will be changed greatly. At that time, the weak points of the United States, such as environmental problems, will become a card in the hands of the United States. How to deal with it will be a big problem for us.

6. Conclusion

Strong nonlinear mapping ability, BP neural network realizes nonlinear fitting from input layer to output layer. Self learning and self-adaptive ability: during training, BP neural network can automatically extract the "reasonable rules" between output and output data through learning, and memorize the learning content in the weight of the network adaptively. That is, BP neural network has high self-learning and self-adaptive ability. The sample size collected is too small, which may lead to the model not fitting. The dimension of original data is reduced and some effective information is eliminated.

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