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Seasonal Adjustment of X13-ARIMA-SEATS based on CPI Time Series

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Abstract

Most of the time series, especially the operation trend of economic time series, are formed by a variety of factors, and the economic time series is the most intuitive basis for observing the economic operation situation. Therefore, it is an important link to accurately identify the influencing factors behind the time series to accurately judge the economic operation status. Season adjustment method decomposes the target time series by mathematical statistics, and divides the time series into four components: trend cycle, season and irregularity, so that time series users can understand the basic trend of time series more clearly. Combined with the latest development trend of time series seasonal adjustment method, this paper takes the national consumer price index (CPI) of China from January 2001 to May 2019 as the empirical research object. Taking the data from January 2001 to May 2018 as the modeling object, based on X13-ARIMA-SEATS model, considering the effect of Chinese traditional festival Spring Festival, using the seasonal in R language In this paper, we adjust the consumer price index (CPI) seasonally, eliminate the seasonal factors and Spring Festival effect factors in CPI time series, and make the data of different months have the basis of comparison. Finally, taking the consumer price index (CPI) data from June 2018 to May 2019 as the prediction object, this model is used to predict the CPI fixed base index series. The prediction results show that the total average relative error is only 0.0117, and the prediction effect of the model is relatively ideal.

Keywords

CPI time series; X13-ARIMA-SEATS; seasonal adjustment; Spring Festival effect.

1. INTRODUCTION

Observing the economic time series, we can find that the fluctuation of the time series is not always dominated by the internal operation trend of the economy. In many cases, it is also affected by seasonal factors, which makes the series present the characteristics of seasonal fluctuation. If the time series contains strong seasonal influence, the direct analysis of the time series itself will make the analysis results deviate. Because seasonal factors will not only cover up the real trend, but also make it difficult for data users to grasp the non-seasonal characteristics of time series. Season adjustment method decomposes the target time series by mathematical statistics, and divides the time series into four components: trend cycle, season and irregularity, so that time series users can understand the basic trend of time series more clearly. At present, the latest international achievement in seasonal adjustment is X13-ARIMA-SEATS (referred to as x13-A-S), which is supported by the Bank of Spain and developed by the Census Bureau of the United States. The program adds the TRAMO/SEATS seasonal adjustment program to the latest version of X12-ARIMA, and has been widely used in the economic analysis process of central banks and research institutions in various countries.

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Price stability, full employment and economic growth have always been the main goals pursued by various countries. The stability of the national consumer price index (CPI) is an important reflection of price stability. Therefore, it is extremely necessary to adjust the CPI time series seasonally, and the European and American countries have already started to release the quarter on month CPI data. Therefore, it can be predicted that the CPI data after seasonal adjustment will become the development trend. Therefore, it is of great theoretical and economic significance to adjust the CPI data of consumer price index by using appropriate seasonal adjustment method and combining with China's reality, which can not only timely reflect the operation of the national economy, but also provide a solid theoretical basis for the government to carry out macro-control.

2. INTRODUCTION OF X13-ARIMA-SEATS

The latest model for seasonal adjustment of time series is X13-ARIMA-SEATS model, which is based on X-12-ARIMA model and combined with TRAMO-SEATS model. The model not only includes the characteristics and advantages of X-12-ARIMA, but also improves its shortcomings. That is to say, the characteristics of TRAMO are integrated in the regARIMA stage, and the advantages of seats are combined in the selection filter, which makes the seasonal adjustment effect more ideal.

2.1. Principle of X-12-ARIMA Model

The X-12-ARIMA method was proposed by the U.S. Census Bureau in the 1990s. This method is a typical representative of the filter based seasonal adjustment method.X-12-ARIMA method not only contains all the characteristics of x-11-arima, but also makes up for the defects of x-11-arima. It has great improvement in modeling and seasonal diagnosis. The main improvement of X-12-ARIMA method lies in its modeling ability of regARIMA module, which has the function of forward derivation and backward prediction.The model is more perfect in data preprocessing, outlier detection and correction, calendar effect preprocessing, and adds the diagnosis results of seasonal adjustment quality as the model judgment standard. After preprocessing the data by regARIMA module, season adjustment is carried out by using X-11 program, that is, moving average method is used to get the components of the model, and finally the seasonal factors are removed. Because the improvement of X-12-ARIMA to x-11-arima mainly lies in regARIMA, the X-11 method is still adopted in the seasonal adjustment module, and the core here is still X-11.

The X-12-ARIMA model can be divided into two modules, regARIMA and X-11.The following is a brief introduction to the principle of the two modules of X-12-ARIMA.

2.1.1 regARIMA model

The ARIMA model is extended to the general case, and the time series is constructed by linear regression model:

$$y_t = \sum_i \beta_i z_{it} + x_t$$

Assuming that Xt obeys the seasonal ARIMA model mentioned above, if there is no autocorrelation in Xt, the regARIMA model is obtained :

$$\varphi(B)\phi\left(B^s\right)\left(1-B^s\right)^D \nabla^d \left(y_t - \sum_i \beta_i z_{it}\right) = \theta(L)\Theta\left(L^s\right)\varepsilon_t$$

In fact, from the above derivation, we can see that the regARIMA model is to consider the ARIMA model. The generalization of regression mean function, or make the random term of regression mean function obey Arima.

2.1.2 X-11 model

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The core method of seasonal adjustment in X-11 module is the multiple iteration moving average method. Specifically, it decomposes the unobservable components of the time series by moving average, and then removes the seasonal factors from the original series. The moving average method adopted by X-11 module is also the core method of X-12-ARIMA module.

(1) Introduction to Moving Average

There are two types of moving average in the process of getting the components of time series by using X-11 filter: simple moving average and Henderson moving average, but their functions are different. Specifically speaking, the biggest feature of the simple moving average is that it can eliminate the seasonality and keep the linear trend of the time series. Herderson moving average has no great influence on seasonality, but it can smooth seasonal factors and trend factors. It can extract trend cycle components from season adjusted series. If there are trend and irregular factors in the series, the smoothed result is the estimation of trend factors. Another important point is that it can catch the turning point and inflection point of time series. According to the characteristics of the data used, Herderson movement can be divided into symmetrical Herderson movement and asymmetric Herderson movement. There are four methods used in asymmetric moving average of data. Musgrove asymmetric moving average gives an asymmetric filter corresponding to different moving average, which is an asymmetric moving method used by X-12-ARIMA. Herderson symmetric shift can only move average the middle part of the sequence, and the two ends of the processed data will be reduced because of the moving average, which will lead to endpoint problems. In order to solve the problem caused by symmetric Herderson motion, Musgrove asymmetric moving average is used.

In X-11, the series obtained by moving average have the following properties: the trend of time series after moving average will not change, and the trend cycle factor of time series is retained; moving average is very effective to eliminate the seasonality of time series, and the number of cycles is the number of moving average items needed; the variance of irregular factors can be reduced.

(2) X-11 seasonal adjustment principle

After the pre adjustment process, the obtained sequence has the following characteristics: the original data has been corrected or divided, so that the adjusted sequence does not have abnormal value and calendar effect; because of the forward derivation and backward prediction of the data in the pre adjustment process, the original time series has been expanded, and the data at this time has made up for the original data moving average will lead to data loss, so if enough data is obtained, the two ends of the sequence do not need to be modified, and asymmetric moving average is also needed when the amount of data is not enough; X-11 regards time series as three parts, in which the trend and cycle do not affect the nature of time series in analysis, so they are taken as a whole, No subdivision. Therefore, time series can be divided into three components: trend cycle factor, seasonal factor and irregular factor, which are represented by TCt, St, It respectively.

2.2. Principle of TRAMO-SEATS Model

T/S method is a model-based computer program developed by Victor Gomez and Agustin Maravall of the Bank of Spain.

It is assumed that the error variables follow the general Arima process:

$$\phi(B)\delta(B)x_t = \theta(B)a_t$$

In the T/S process, it is assumed that the sequence has seasonal factors, that is, it satisfies the following multiplicative structure:

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$$\begin{cases} \delta(B)=(1-B)^d\left(1-B^s\right)^D \\ \phi(B)=\left(1-\phi_1 B-\cdots-\phi_p B^p\right)\left(1-\Phi_1(B)B^s-\cdots\Phi_p(B)B^{sp}\right) \\ \theta(B)=\left(1-\theta_1 B-\cdots-\theta_q B^q\right)\left(1-\Theta_1 B^s-\cdots-\Theta_P B^{Q_s}\right) \end{cases}$$

s means the annual value of observation is seasonal factor. This model is ARIMA (P, D, q) (P, D, Q), also known as regression ARIMA model.

T/S model for missing values, outliers processing:

(1) Missing value

Missing observations are processed in two ways, by smoothing the missing values or assigning a temporary value.

(2) Outliers

The model will set a standard as in advance, and set the occurrence time of outliers as t = T. given ARIMA model, we can get the corresponding T values of outliers as $\hat{\tau}_{AO}(T)$, $\hat{\tau}_{TC}(T)$, $\hat{\tau}_{LS}(T)$ define them respectively. At the time when $\lambda_T > AS$, it indicates that they are significant outliers. The setting of AS values is closely related to the number of observations, and the value of AS decreases with the increase of the number of observations. If the occurrence time of outliers is unknown, then we randomly select N points, and make $\lambda_T = \max\{\lambda_t\} = |\hat{\tau}_{TP}(T)|$,so that if $\lambda_T > C$, then time t has a TP type (possibly AO, TC, LS) outliers. Finally, we estimate multiple outliers in all models to avoid these effects.

Basic principle of seats module:

Suppose that the original sequence is Xt (or its logarithmic transformation), then $z_i = \delta(B)x_i$ it represents the difference sequence, where $\delta(B)$ represents the lag operator. In seats, $\delta(B) = \nabla^d \nabla_s^D$,where $\nabla^d = (1-B)^d, \nabla_s^D = \left(1-B^s\right)^D$ represents the non-seasonal difference and the seasonal difference of period s respectively. The difference model is applied to the difference sequence Zt: $\phi(B)\left(z_t - \bar{z}\right) = \theta(B)a_t$,where $\bar{z}$ is the average of z_t , at is the white noise sequence, and is the autoregressive (AR) and moving average (MA) polynomials of B. The multiplication form is further decomposed into seasonal polynomials and non-seasonal polynomials:

$$\phi(B) = \phi_r(B)\phi_s\left(B^s\right),$$

$$\theta(B) = \theta_r(B)\theta_s\left(B^s\right)$$

The model was obtained:

$$\phi_r(B)\phi_s\left(B^s\right)\nabla^d\nabla_s^D x_t = \theta_r(B)\theta_s\left(B^s\right)a_t + c$$

The simplified form is as follows:

$$\Phi(B)x_t = \Theta(B)a_t + c$$

In the seats model, the time series XT will be decomposed into multiple components. Either the additive model or the multiplication model can be selected. However, since the multiplication relationship can be transformed into an addition relationship by taking logarithm, the addition model is finally selected:

$$x_t = \sum_i x_{it}$$

Where xit represents the decomposed component.

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2.3. X13-ARIMA-SEATS Model Principle

X13-ARIMA-SEATS model, as the name suggests, is based on the research results of X-12-ARIMA model. The seeds module of TRAMO/SEATS model is introduced for improvement. At the same time, two seasonal adjustment modes of X-11 and seats are provided to optimize the inspection and diagnosis method of the model.

(1) Outliers

The main improvement of X13-ARIMA-SEATS model in outlier processing is the addition of temporary horizontal drift outliers (TLS).

The basic meaning of TLS is as follows: start time t0 (s represents seasonal adjustment period)

$$SO_t^{t_0} = \begin{cases} 0, t \geq t_0 \\ 1, t < t_0 \\ -1/(s-1), else \end{cases} \quad \text{t, to are in same month}$$

(2) Trading day effect

X13-ARIMA-SEATS model simplifies the way to deal with the trade day effect

$$TD(t) = N_t^{WD} - \frac{5}{2}\left(N_t^{SS}\right)$$

Among them, NtWD represents the number of working days. From the expression of the model, we can see that the potential constraint of the model is that weekdays (i.e., Monday to Friday) have the same effect on the time series.

(3) Impulse and intervention regression variables

One of the innovation of X13-ARIMA-SEATS model is the introduction of impulse regression variable in the former TRAMO program. The principle of the model is to generate a linear regression element composed of 0 and 1 by setting the starting point and duration of the pulse effect (i.e., the value of the regression element is 1 when it is within the duration period and 0 when it is at other times). The model for filtering the pulse effect is as follows:

$$X_t = \frac{1}{(1-\delta L)} X_t$$

$$X_t = \frac{1}{\left(1-\delta_s L^s\right)} X_t$$

(4) Seasonal adjustment quality diagnosis

Compared with the previous generation of X-12-ARIMA model, the X13-ARIMA-SEATS model has made a great improvement in the diagnosis of seasonal adjustment quality.

Previous generations of seasonal adjustment models are based on ARIMA model to forecast time series forward and backward, and use WK filter to implement seasonal adjustment and test diagnosis. Based on the theory of signal extraction matrix, X13-ARIMA-SEATS model constructs finite samples to improve the accuracy and efficiency of model test; furthermore, it optimizes the test methods of translation interval test, modified history check and mobile holiday effect, and introduces F statistic in model-based method to test the seasonal stability of time series.

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3. EMPIRICAL STUDY ON SEASONAL ADJUSTMENT OF X13-ARIMA-SEATS BASED ON SPRING FESTIVAL EFFECT

3.1. Data Description and Processing

This paper takes the national consumer price index (CPI) from January 2001 to May 2019 as the object of empirical study. The data from January 2001 to May 2018 are used as the modeling object and the data from June 2018 to May 2019 as the prediction object to test the prediction results of the model. All data are subject to the website of the Statistics Bureau of the People Republic of China. Since the data collected from the statistics bureau network are year-on-year data, that is, based on the same month of the previous year, the base period of each year data is different. In case of different base periods, seasonal adjustment is meaningless. Therefore, in order to make the data comparable, it is necessary to process it before seasonal adjustment.

This paper takes each month in 2001 as the base period, assuming that the initial value of the national consumer price index (CPI) in each month of 2001 is 100, and the corresponding fixed base index is obtained by multiplying the month-on-year CPI from January 2001 to May 2019.Here we take 2005 as an example, assuming that P represents the price level, CPI2005-6-tb represents the same year-on-year consumer price index in June 2005, and CPI2005-6-fix represents the fixed base consumer price index based on June 2001. The relationship between the variables is as follows:

The essence of the year-on-year consumer price index is the relationship between price levels.

$$CPI_{2005-6-\text{tb}} = \frac{P_{2005-6}}{P_{2004-6}}$$

Fixed base consumer price index can be expressed as follows:

$$CPI_{2005-6-\text{fix}} = \frac{P_{2005-6}}{P_{2001-6}} = \frac{P_{2005-6}}{P_{2004-6}} \times \frac{P_{2004-6}}{P_{2003-6}} \times \cdots \times \frac{P_{2002-6}}{P_{2001-6}}$$
$$= CPI_{2005-6-\text{tb}} \times CPI_{2004-6-\text{tb}} \times \cdots \times CPI_{2002-6-\text{tb}}$$

This paper takes each month in 2001 as the base period and multiplies the year-on-year data of each month to get the fixed base index, as shown in Figure 1.

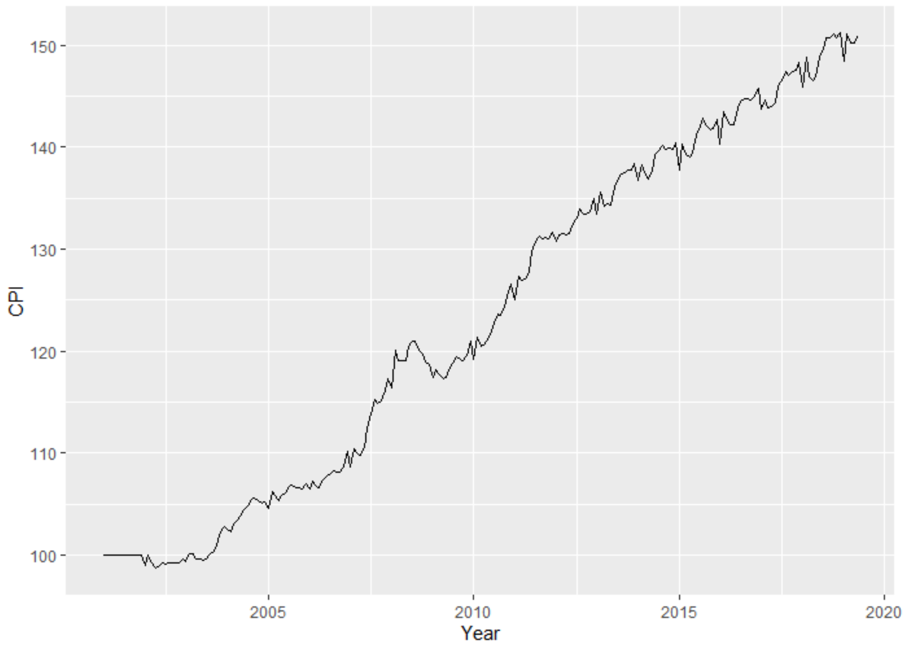

Figure 1. Original sequence diagram of CPI fixed base index

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3.2. Seasonal Adjustment Model Considering Spring Festival Effect

3.2.1 Model establishment and results

This paper mainly constructs the impact of the Spring Festival effect on the consumer price index. Considering the actual situation of the Spring Festival holiday in China, Chinese people are generally used to purchase new year goods from about 10 days before the Spring Festival, and reach the peak of buying new year goods two days before the Spring Festival. After that, the influence of the festival continues until after the Lantern Festival on the 15th day of the first month of the lunar calendar. In this paper, the influence of Spring Festival on food price index is set as "Λ type" distribution, the first stage is set to be 10 days before the festival to 2 days before the festival, lasting for 8 days, and the second stage is set to be from 1 day before the festival to the end of the Lantern Festival on the 15th day of the first month, lasting for 16 days. The first paragraph is increased, and the second is decreasing. Generation of Spring Festival holiday regression variable pre_cny and post_cny by genhol function in seasonal package of R language, these two custom variables are added to the regression equation for estimation. Outliers are set to automatically select four common outliers and seasonal outliers. In order to avoid the influence of heteroscedasticity on the model, this paper uses R language to set the natural logarithm of consumer price fixed base index.

After determining the regression variables of Spring Festival effect, a model is established, and the results are shown in Table 1.

Table 1. Results of seasonal adjustment model of consumer price index in China

	variable	Estimated value	Standard error	P value
Pre holiday effect	Pre_CNY	0.0038	0.0006	2.1e-11 ***
Post Festival effect	Post_CNY	0.0072	0.0012	7.2e-10 ***
Abnormal value test	LS2008.Feb	0.0155	0.0030	1.9e-07 ***
Non seasonal model	MA(1)	0.3584	0.0656	4.7e-08 ***
Seasonal model	MA(12)	0.6557	0.0515	< 2e-16 ***

The estimated values of Spring Festival effect before and after the festival were 0.0038 and 0.0072 respectively. From the p value, we can see that the Spring Festival effect variable pre_CNY and post_CNY has a strong significance, indicating that the consumer price index is significantly affected by the Spring Festival effect, and the spring festival activities have a positive impact on the food price index. Transaction day regression and leap year effect calculation show that the trade day effect and leap year effect of food price index are not significant. Therefore, there is no trade day and leap year adjustment in the analysis and modeling process. Only one outlier was detected by outlier test, which was February 2008. The type of outlier was horizontal movement. The regression coefficient is positive, P value is 1.9e-07, the influence is very significant. It is obvious that the food price index was affected by the rare freezing rain and snow disaster in southern China during the Spring Festival in 2008.

The next step is to establish ARIMA model. After identification and comparison, the model determined by x13-A-S method is ARIMA (1,1,0) (0,1,1), which means that after one non seasonal difference and one seasonal difference, it is a 1-order non seasonal autoregressive term and a first-order seasonal moving average stationary sequence.

The seasonal test results of consumer price index in China are shown in Table 2 and Table 3-3.

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Table 2. Seasonal F test of consumer price index

Inspection type		Sum of squares	freedom	mean square	F value
stable seasonal F-test (original hypothesis: no seasonal effect)	Between months	41.066	11	3.733	58.808**
	residual	12.50605	197	0.063	
	total	53.57207	208		
Moving seasonal F-test (original hypothesis: annual change has no effect)	Between years	4.0021	16	0.25	7.864**
	error	5.59799	176	0.032	

Table 3. Seasonal Kruskal walls test of consumer price index in China

K-W statistics	freedom	Probability level
157.7315	11	0%

X-11 season adjustment uses 3×5 seasonal moving filter to estimate seasonal factor, and 9-period Henderson trend filter to estimate trend cycle factor. The results of two F-tests and Kruskal Wallis test show that at the 0.1% and 1% significance levels, there are not only stable seasonality, but also moving seasonality in the food price index, that is, the food price index fluctuates not only with the month, but also with the year.

3.2.2 Seasonal adjustment results predicted by the model

Seasonal adjustment of time series is not a new topic in China. In recent years, the relevance of this topic has been improved to a certain extent. However, considering the problem of seasonal adjustment standard, there is no fixed statement on how to adjust CPI scientifically and effectively, and the methods are also different. This paper analyzes the effect of the seasonal adjustment method considering the Spring Festival effect. On the one hand, because most time series have seasonal problems, this method can provide scientific data for empirical research as a basic reference, on the other hand, it can also verify the mobile holiday, which specifically refers to the impact of Chinese Spring Festival on time series data.

The main purpose of seasonal adjustment is to analyze the internal laws and trends of the selected variables more intuitively by eliminating the seasonal components. After the model passed the test, the season adjusted sequence was obtained. Figure 2 shows the trend of the seasonally adjusted series and the original series. It can be seen from figure 2 that there are many burrs in the series before seasonal adjustment, and they are almost evenly distributed on and off the trend line, indicating the existence of seasonal influence, which makes the changes of CPI appear some degree of irregularity, or there are external shocks or abnormal values, which makes the economic series unstable. After seasonal adjustment, the burr of CPI disappears and becomes smooth, which proves that the adjusted CPI eliminates certain seasonal effects and reduces the impact of external shocks or outliers. From the seasonal adjustment sequence, it can be seen that China consumer price index can be roughly divided into two stages. The first stage: from 2001 to the second half of 2003, the consumer price index did not change much during this period, indicating that the consumer price was stable and did not change significantly. The second stage: from the second half of 2003 to 2018, the consumer price index showed a long-term growth trend, in which there was a short-term decline between 2008 and 2009, and the reason for the decline was related to the global financial crisis. The

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world financial crisis in 2008 inhibited China economic growth, making the consumer price index decline.

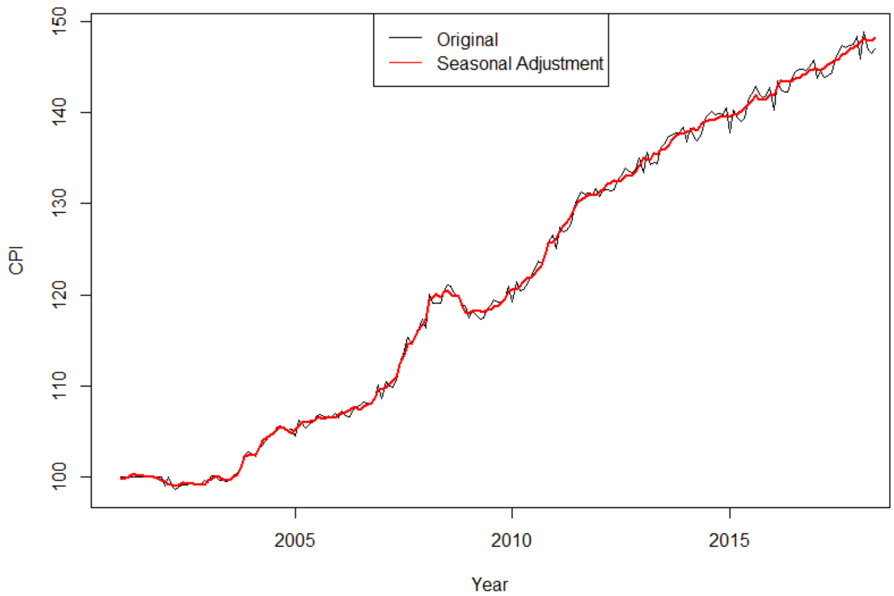

Figure 2. The original sequence of CPI and its seasonal adjustment sequence

Figure 3 shows the trend chart of seasonal factors and Spring Festival effect of consumer price index. It is easy to see that the influence of seasonal factors decomposed is significantly different from that of Spring Festival effect. Seasonal components fluctuate significantly, and seasonal strength is different in different years. Seasonal components have little impact on consumer price index from 2001 to 2005, and then the impact increases gradually. In the following years, the seasonal component remained at a relatively stable level, indicating that the impact of seasonal components on consumer prices is relatively stable. In a single year, around January each year, consumer prices will present a peak. After that, people demand for commodities will decline with the fading of the festival atmosphere, and enter the trough period of the whole year. Next, the consumer price index will show a second peak around July every year, and then it will decline again. The Spring Festival effect is mainly influenced by the consumption factors during the Spring Festival. The Spring Festival effect will increase the demand for goods, drive up the price, and lead to the rise of the consumer price index. The impact of the Spring Festival is mainly concentrated in January, February and March, and has no impact on other months. In addition, the timing chart of irregular components after seasonal adjustment of CPI is shown in figure 4.

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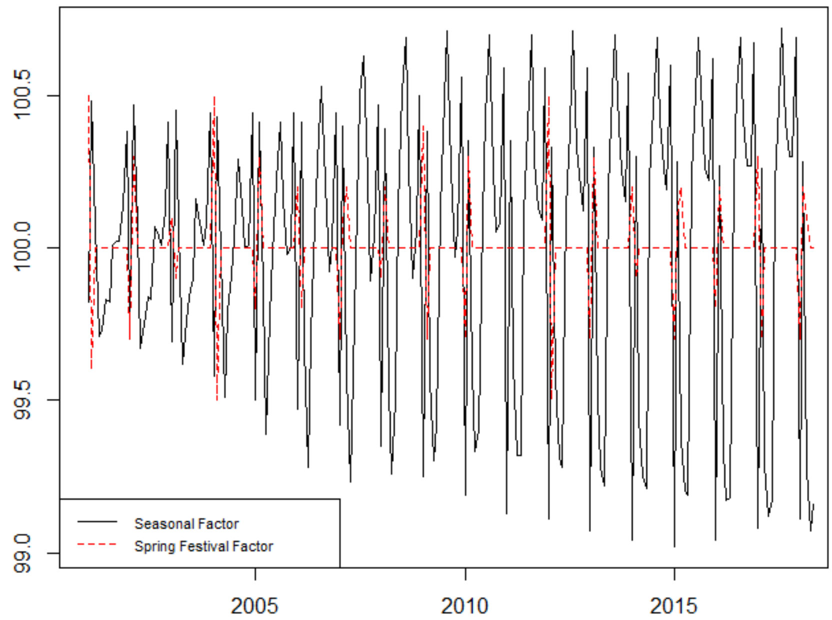

Figure 3. Seasonal factor and Spring Festival factor of CPI

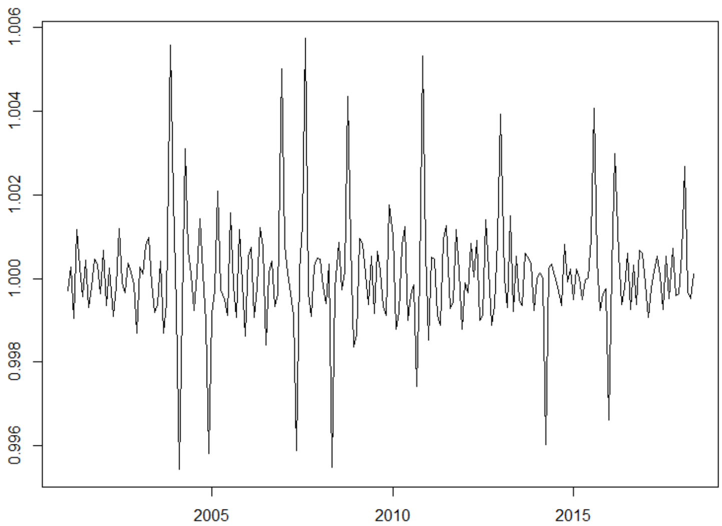

Figure 4. Irregular components of consumer price index

11 m-statistics and q-statistics based on m-weighted average are designed to test the quality of X13-ARIMA-SEATS model based on Spring Festival effect. M-test requires 11 m-statistics to be less than 1, while Q-test requires 11 m-statistics to be weighted by different weight combinations to obtain Q-value, the smaller the better. It can be seen from Table 4 that the values of each statistic are less than 1, and the value of Q statistic is 0.39, so the quality of the model is high.

Table 4. Seasonal adjustment statistics

M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	Q
0.262	0.051	0.000	0.448	0.062	0.300	0.510	0.830	0.617	0.627	0.581	0.39

3.2.3 Model prediction

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Taking the fixed base index of China consumer price index (CPI) from June 2018 to May 2019 as the prediction object, the prediction results of the above-mentioned X13-ARIMA-SEATS seasonal adjustment model considering the Spring Festival effect are tested, and the actual data are compared with the predicted results. The results are shown in Table 5.

Table 5. Comparison of actual and predicted CPI base indices

time	actual value	predicted value	relative error
2018Jun	148.8012	148.702	0.0034
2018Jul	149.6311	149.354	0.0057
2018Aug	150.7748	150.040	0.0076
2018Sep	150.7623	149.737	0.0093
2018Oct	151.0855	149.799	0.0106
2018Nov	150.7513	150.000	0.0119
2018Dec	151.1675	150.837	0.0130
2019Jan	148.3934	148.599	0.0141
2019Feb	151.0763	150.958	0.0150
2019Mar	150.2226	149.499	0.0159
2019Apr	150.1819	149.396	0.0168
2019May	150.9011	149.753	0.0176
Total average relative error			0.0117

As can be seen from Table 5, the effect of the seasonal adjustment model of X13-ARIMA-SEATS considering the Spring Festival effect is relatively ideal. The prediction result of CPI fixed base index from June 2018 to May 2019 by using this model is very close to the real value, and the total average relative error is 0.0117, that is, the predicted value is very close to the real value, so the model has important practical significance.

4. CONCLUSION

This paper uses the national consumer price index (CPI) calculated from January 2001 to May 2018 as the modeling object of empirical research, and uses the latest X13-ARIMA-SEATS seasonal adjustment model to adjust the consumer price index (CPI) in consideration of the effect of the Chinese traditional festival Spring Festival. The model shows that the pre holiday and post holiday effects of the Spring Festival are very significant. It has a positive effect on the consumer price index (CPI); the abnormal value detected is February 2008; the model is established as (1,1,0) (0,1,1) seasonal adjustment model, through seasonal test and residual seasonal test, it not only has stable seasonality, but also has moving seasonality; m1-m11 statistics are less than 1, Q statistic value is 0.39, the constructed model is more reasonable. Finally, using the data of the model from June 2018 to May 2019, the total average relative error is 0.0117, the predicted value is very close to the real value, which can well predict the trend of consumer price index (CPI).

The results of this paper verify that seasonal factors do have an impact on statistical data, so in order to improve the generality and quality of statistical data, it is necessary to adjust the statistical data seasonally. Although there are many popular seasonal adjustment methods in the world, they are widely used, and the quality of seasonal adjustment is relatively good. However, these seasonal adjustment methods are developed by foreign statisticians or institutions according to the actual situation of foreign countries. Problems such as the

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adjustment of mobile holidays are only aimed at foreign festivals, so the domestic cannot simply adjust the foreign seasonal adjustment methods. The introduction of the law must be adjusted according to China national conditions. At present, there are few researches on seasonal adjustment in China. Some statistical institutions, such as the National Bureau of statistics and the people Bank of China, have relatively lagged behind in the research on seasonal adjustment theory, and some research results are only for internal use, which leads to the slow promotion of the theory and practical application of seasonal adjustment. This paper introduces the latest seasonal adjustment model and combines with the transmission of China. It is hoped that the Spring Festival can introduce more foreword theories for domestic seasonal adjustment research, and finally contribute to the development of domestic seasonal adjustment.

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