CHINESE GDP FORECAST USING ARIMA MODEL

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Abstract

China's economy is very interesting to analyze because it is recognized as the highest GDP in the world. Despite the ability of China's economy to reform and grow, China shows fluctuation in its economy especially after the crisis in 1997 and 2008. When China was able to counter the 2008 financial crisis, unfortunately starting from 2010 the GDP growth started to decrease again. Therefore, the objective of this research is to analyze the GDP of China in two consecutive years of 2016 and 2017 using the ARIMA. The journal that will be used uses a time series. time seriesis commonly used for series of data obtained chronologically. The future value of a time series can most likely be predicted through its current and past values. This research uses EViews software. Eviews software can be called a combination of software specifically made to process data on time series. This research also uses the Model Autoregressive Integrated Moving Average (ARIMA) method, a time series estimation method, which can be used with EViews software. Based on the EViews software, the forecasting process with the ARIMA model is illustrated in this work, namely, China's Gross Domestic Product (GDP) estimated from 2016 to 2018.

Keywords: GDP, Unemployment Rate, Poverty Rate.

INTRODUCTION

China has shown the most dramatic economic developments during the past decades. Before the economic reform and trade liberalization, the policies made China's economy stagnant, verypoor, inefficient, and centrally controlled and isolated from the global market. Since the economic reformation and the strategy to open up the economy in 1978, there have been so many improvements in terms of standard of living. It has transformed its economy into a privatesector-led economy and integrated into the global economy. China's economy is very interesting to analyze because it is recognized as "the fastestsustained expansion by a major economy in history" by the World Bank. Despite the abilityof China's economy to reform and grow, China shows the fluctuation in its economy especially after the crisis in 1997 and 2008. When China was able to counter the 2008 financial crisis, unfortunately starting from 2010 the GDP growth started to decrease again. As the nation with the second-largest GDP in the world in 2010, China passed Japan. Up to now, this job has been held. By 2030, according to some experts, China's economy will have outpaced that of the US.

China is now a new economic force in the world, and it is stated that its success is hard to duplicate or match. No nation can replicate China's economic transformation, claims aBloomberg Economics analysis. With financial and technological support from Japan, Taiwan,and Hong Kong, China has a sophisticated network of manufacturing facilities, suppliers, logistics providers, and transportation infrastructure. Over the past three decades, the nation has also had nearly frictionless access to international markets and a sizable, inexpensive, intellectual labor population. As a result of the loans it has granted to other nations, China is a nation that lends a lot of money to other emerging nations in order to gain influence and dominance over their governments.

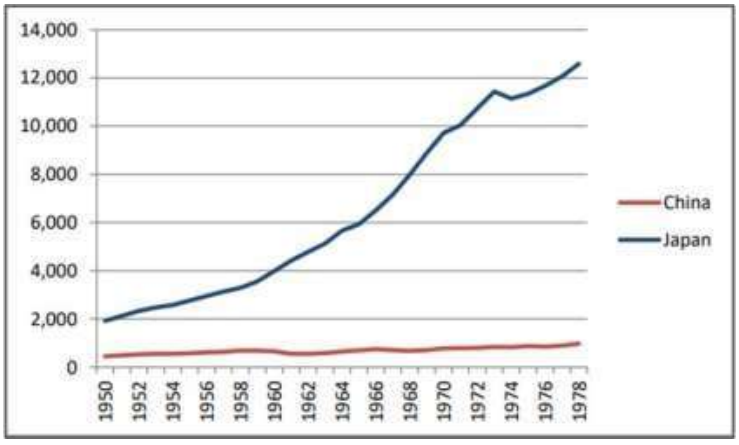
In order to achieve its goal of becoming a developed nation, China has worked to create an economic system that is stable and capable of handling any crises or issues that may arise, both to prevent the country's economic conditions from being easily criticized and to maintain the confidence of foreign investors. China's goal is to continue to inspire international investors to make more aggressive investments in the country. China's inclusion in the international trade organization (WTO) in 2001 boosted its position as the hub of global trade and production. Even so, 33 countries' top export destination is China, while 65 countries' top import source is China. Chinese investment is also still increasing. China rose to become both the second-largest investor and the second-largest investor recipient globally in just the five-year period between2015 and 2017.

Therefore, the objective of this research is to analyze the GDP of China in two consecutive years of 2016 and 2017 using the ARIMA. The benefit of this approach is that, despite the need that the process be stationary first, it may accept any sorts of model data. Additionally, when utilized for short-term forecasting, this strategy is more accurate. The result of the forecast then compared with the real GDP of 2016 and 2017 data available. If the forecasting result shows significance and accuracy, this method could be the basis for other researchers to forecast the real GDP of China in the future especially in 2023 and 2024 when there is an intention betweenChina and the U.S economy.

Economic History of China

Before 1978, in China's economy there were no market mechanisms that can allocate resources efficiently and there were very small incentives for firms, workers, and farmers to be more productive and produce more quality goods because they have to focus only on theproduction goals set by the government. In addition, China's real GDP that grew at an average annual rate of 6.7% from 1953 to 1978 are questioned by many analysts regarding the accuracy of the data because the Chinese government officials (especially at the subnational levels) often exaggerated production levels for a variety of political reasons. China's GDP per capita growthis stagnant if compared with Japan as shown in figure 1.

Figure 1. China & Japan GDP per capita comparison 1950-1978



***Source**: Angus Maddison, Historical Statistics of the World Economy: I-2008 AD.*

The transformation of its economy after 1978 is focused on the private sector-led economy and global economic integration. The private sector is the segment in the national economy that is run by the individuals or enterprises with the objective to get the profit and it is not owned and operated by the government or not state controlled. After the reformation, the private sector is

the main driver of China's economic growth with the combination of 60/70/80/90 contribution, which are contribute 60% of China's GDP, 70% of innovation and investment, 80% for urbanemployment and 90% for new job provided and exports (Zitelman, 2019).

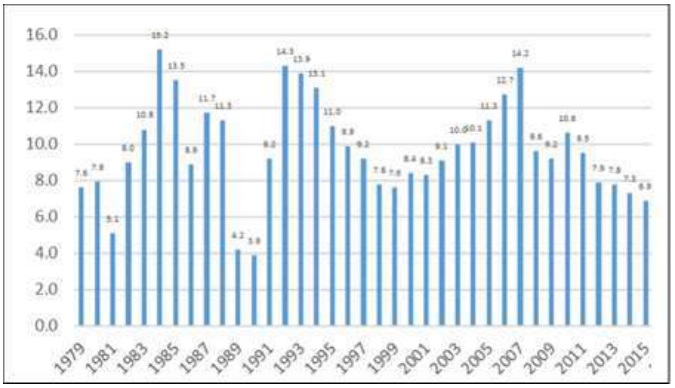
In terms of Global Economic Integration, before the economic reform, the foreign trade policy of China is mainly focused on self-sufficiency or how to fulfill the needs of the country through imports. While exports are considered only as the way to generate foreign exchangeincome to pay the imports, and as the responsibility of a negligible number of state-owned monopoly companies (Delisle and Goldstein, 2019 in Zitelman, 2019). The government also set the price to producers and prohibited the Foreign Direct Investment (FDI) that was interpreted as the dependency on the other countries. After the economic reform thegovernment started to openthe global economy in three phases.

The first phase is when the state-owned foreign companies were founded, the large companies were given rights for foreign trade, the products that are allowed for foreign trade was increased, and the "Special Economic Zone (SEZ)" was established. SEZ is the zones that are located on the coast and available for the foreign investors to produce at world market conditions with the advantage of China's low wages and tax conditions.

The second phase was focused on the export strategy. It is marked by the agreement with foreign trade companies that focuses on foreign exchange revenues, export cost and efficiency, also the transformation of the entire coastal region to be an export-oriented economic region. The Foreign Direct Investment becomes more important in this phase, especially the investorsfrom Taiwan and Hong Kong.

The third phase is marked by the significant increase of FDI, and the limitation to dampen the competitive effect from the open economy through high import duties. Unfortunately, the Asian Financial crisis 1997 also occurred in this phase. Due to the continuing decline of the domestic demand and other consequences from the crisis, China joins the World Trade Organization (WTO) by the end of the third phase.

Figure 2. China's Annual Real GDP Growth (%) 1979-201



Source: IMF, and Chinese National Bureau of Statistics.

The economy of China keeps growing and is recognized as "the fastest sustained expansion bya major economy in history." by the World Bank. The growth has enabled China to double its GDP every eight years and make around 800 million people out of poverty (CRS Report, 2019). In 2021 China was placed as the second largest economy in the World based on the Purchasing Power Parity (PPP), and categorized as the upper-middle-income country. In relation to the U.S. economy, China has become the major commercial partner. China is the largest merchandise trading partner, biggest source of imports, third-largest export market, and thelargest foreign

holder of treasury securities of the U.S (CRS Report, 2019).
China's economy is not growing smoothly all the time. Due to the financial crisis in 2008, at the beginning of 2009 around 20 million migrant workers had returned after being unemployed, and the real GDP growth fell to 6.8%. However, China's government is able to counter the effect of the crisis by implementing a $586 billion economic stimulus package tofund the infrastructure and to increase the bank landing. As a result, China's real GDP growthincreased with an average of 9.7%. Unfortunately, years after 2010 the real GDP growth keeps falling.
The tension between China and The U.S. is warned by many economists that it could slow down the economic growth of China. Imposing punitive economic measures against each other between China and The U.S. such as the increase in tariffs on all trade could reduce China's real GDP in 2021-2022 by 1.1% relative to the OECD's baseline economic projections. Therefore it is important to analyze the forecasting method that is most significant to generate the most accurate data as the basis for the China government to takeany economic decision inthe future.

ARIMA Model

The ARIMA Model Box and Jenkins proposed the ARIMA model, a time series prediction approach, in the 1970s.AR, I, and MA make up the model. Here, AR stands for Autoregressive model, I stands for Integration, signifying the order of a single integer, and MA is for Moving Average mode. Box and Jenkins proposed the ARIMA model, a time series prediction approach, in the 1970s. AR,I, and MA make up the model. Here, AR stands for Autoregressive model, I stands for Integration, showing the order of a single integer, and MA is for Moving Average model. A stationary sequence, in general, can create a metrology model. The unit root test is used to judge the stationarity of the sequence. As for a non-stationary sequence, it should beconverted to a stationary sequence with difference operation. The number of corresponding difference is called as the order of single integer. The ARIMA (p, D, q) model is essentially a combination of differential operation and ARMA (p, q) model [3, 4]. A non-stationary I (D) process is one that can be made stationary by taking D differences. The process is often called difference- stationary or unit root processes. A series that can be modeled as a stationary ARMA (p,q) process after being differenced D times is denoted by ARIMA (p,D,q) [5]. The form of the ARIMA (p,D,q) model is

$$\Delta Dyt=c+\varphi 1\Delta Dyt-1+\ldots+\varphi p\Delta Dyt-p+\varepsilon t+\theta 1\varepsilon t-1+\ldots+\theta q\varepsilon t-q. \quad (1)$$

Where ΔDyt denotes a D-th differenced series, and εt is an uncorrelated process with mean zero. In lag operator notation, Liyt=yt−i. The ARIMA (p,D,q) model can be written as

$$\varphi*(L)yt=\varphi(L)(1-L)Dyt=c+\theta(L)\varepsilon t. \quad (2)$$

Here, φ∗(L) is an unstable AR operator polynomial with exactly D unit roots. Someone can factor this polynomial as φ(L)(1−L)D, where φ(L)=(1−φ1L−……−φpLp) is a stable degree p AR lag operator polynomial. Similarly, θ(L)=(1+θ1L+…+θqLq) is an invertible degree q MA lag operator polynomial. When two out of the three terms in ARIMA(p,D,q) are zeros, the model may be referred to, based on the non-zero parameter, dropping "AR", "I" or "MA" from the acronym describing the model. For example, ARIMA (1,0,0) is AR (1), ARIMA (0,1,0) is I (1), and ARIMA (0,0,1)is MA(1).

The ARIMA model is a popular time series model and a high-precision short-term prediction model.

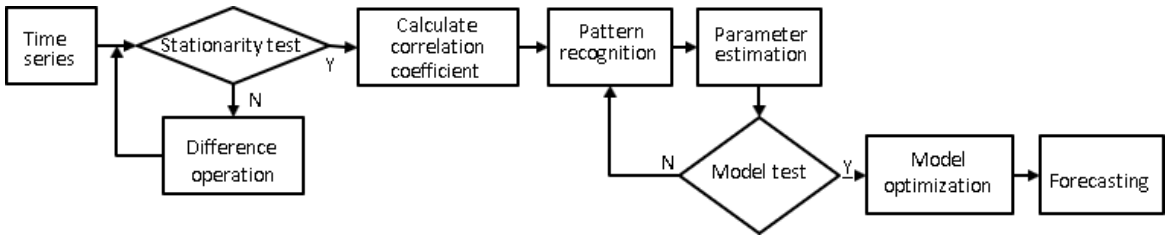
The model's main notion is that certain time series are a collection of random variables that vary over time, but the changes in the total time series follow specific laws that can be represented by the related mathematical model. It may gain a better understanding of the structure and features of time series by analyzing the mathematical model and achieving the best forecast in terms of least variance.

RESEARCH METHOD

The procedure of ARIMA modeling

The procedure flow chart of ARIMA modeling and forecasting is given in Figure 3.

Figure 3. The procedure flow chart of ARIMA modeling and forecasting.



The ARIMA modeling approach is used to determine the parameters p, D, and q [6, 7, 8, 9].The following is a full description of the ARIMA modeling process:

1. Determining the time series' stationarity. The stationarity of the sequence is determined using the time series' line graph, scatter plot, autocorrelation function, and partial autocorrelation function graphs. The Augmented Dickey-Fuller (ADF) unit root is commonly used to assess the variance, trend, and seasonal variation, as well as to identify stationarity.
2. Finding the order of a single integer D. If the time series is stationary, proceed directly to Step (3). If the time series is not stationary, a suitable transformation (such as difference, variance, stationarity, logarithm, and square root) should be performed to convert it to a stationary sequence. The order of the differences is a single integer
3. ARMA modeling. As for the result sequence of Step (2), autocorrelation coefficient (ACF) and partial autocorrelation coefficient (PACF) of the sequence are calculated. And thevalues of the autocorrelation order p and the moving average order q of the ARMA model can be estimated. The basic principle for determining the order p and q is given in Table 1.

Table 1. Basic principle of determining the order of ARMA (p,q).

Autocorrelation coefficient (ACF)	Partial autocorrelation coefficient (PACF)	Model order
/	p-order truncation	AR(p)
q-order truncation	/	MA(p,q)
trailing	trailing	ARMA(p,q)

4. Performing parameter estimation. The autocorrelation and partial autocorrelation graphs are used to judge the number of autocorrelation coefficients and partial autocorrelation coefficients with remarkably significant levels. In these ,steps the rough model of the sequencecan be selected.
5. Diagnostic test and optimization. The model is diagnosed and optimized by performing a white noise test on the residual. If the residual is not a white noise, return to Step (4) and re-select the model. If the residual is a white noise, return to Step (4) and createmultiple

models,and choose the optimal model from all the fitted model of the test.

Procedure of ARIMA forecasting

The ARIMA model can anticipate the future value of a time series. Modeling and prediction using the ARIMA model is a significant use of EViews software. EViews has two prediction methods: static and dynamic. Dynamic is a short-term dynamic forecast, whereas Static is a one-step advance prediction. The steps are as follows:

If the time series is a non-stationary sequence, it should be firstly converted to a stationary sequence. The best model parameters are selected and the ARIMA (p, D, q) model isestablished.

In the Equation window of the EViews software, select the Forecast menu. In the dialog box, Static or Dynamic can be selected as needed. Someone can modify the name of forecasting sequence or use the default value, and click OK.

RESULT

Data description

The Gross Domestic Product (GDP) is the primary indicator used in national economic accounting. It is a key metric for determining a country's overall economic position. It indicates the economic strength, structural arrangement, and market scale of the country. The Chinese National Bureau of Statistics amended the research and development expenditure accounting system in 2016 in accordance with the worldwide standard of national economic accounting jointly issued by the five major international organizations, theNational Account System 2008. Table 2 shows the corrected China GDP statistics from 1952 to 2015. In the parts that follow, we model and predict GDP statistics..

Table 2. China GDP data from 1952 to 2015.

Year	GDP (hundred million RMB)	Year	GDP (hundred million RMB)	Year	GDP (hundred million RMB)
1952	679	1974	2828	1996	71814
1953	824	1975	3039	1997	79715
1954	860	1976	2989	1998	85196
1955	912	1977	3250	1999	90564
1956	1031	1978	3679	2000	100280
1957	1071	1979	4100	2001	110863
1958	1312	1980	4588	2002	121717
1959	1448	1981	4936	2003	137422
1960	1470	1982	5373	2004	161840
1961	1232	1983	6021	2005	187319
1962	1162	1984	7279	2006	219438
1963	1248	1985	9099	2007	270232
1964	147	1986	10376	2008	319516
1965	1734	1987	12175	2009	349081
1966	1889	1988	15180	2010	413030
1967	1794	1989	17180	2011	489301
1968	1744	1990	18873	2012	540367
1969	1962	1991	22006	2013	595244

1970	2280	1992	27195	2014	643974
1971	2457	1993	35673	2015	685506
1972	2552	1994	48637		
1973	2756	1995	61340		

Stationarity test

The GDP data series during 1952-2015 is plotted is Figure. 4. The result of the stationarity test(ADF test) on the data is given in Table 3.

Figure 4. The GDP data during 1952 to 2015.

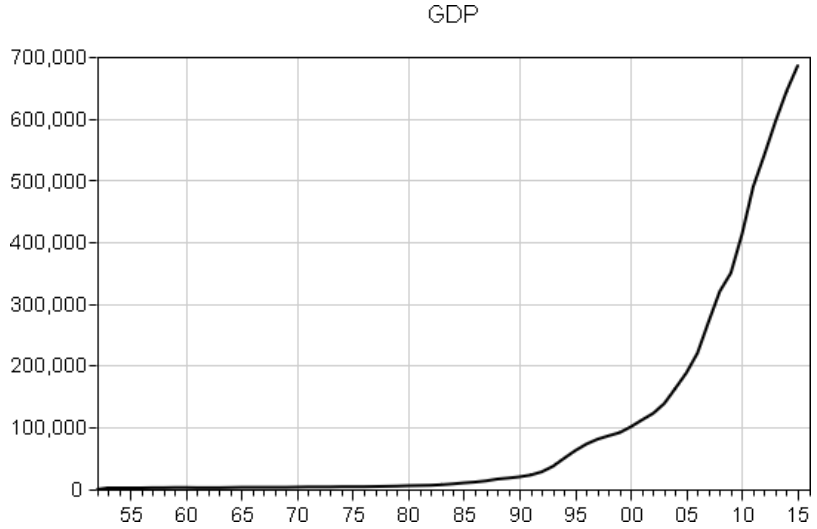


Table 3. Augmented Dickey-Fuller unit root test on GDP.

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 7 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	3.651882	1.0000
Test critical values: 1% level	-3.552666	
5% level	-2.914517	
10% level	-2.595033	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Date: 12/17/22 Time: 01:55

Sample (adjusted): 1960 2015

Included observations: 56 after adjustments

It can be seen that ADF=3.651882 is greater than the critical value of the significance level of0.01, 0.05 and 0.1, that is to say, the original GDP sequence is non-stationary.

Table 4. Augmented Dickey-Fuller unit root test on LGDP.

Null Hypothesis: LGDP has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.397117	0.9988
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

In Figure 4, the original sequence is exponential. Taking the natural logarithm of the GDP datato eliminate its non-stationary and obtaining the LGDP sequence. And taking LGDP for ADF test, ADF=1.397117 is still greater than the critical value of the significance level of 0.01, 0.05and 0.1. The LGDP sequence still accepts the null hypothesis with a large P value. The LGDP sequence is still nonstationary.

Table 5. Augmented Dickey-Fuller unit root test on DLGDP.

Null Hypothesis: D(LGDP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.340237	0.0009
Test critical values:	1% level	-3.542097	
	5% level	-2.910019	
	10% level	-2.592645	

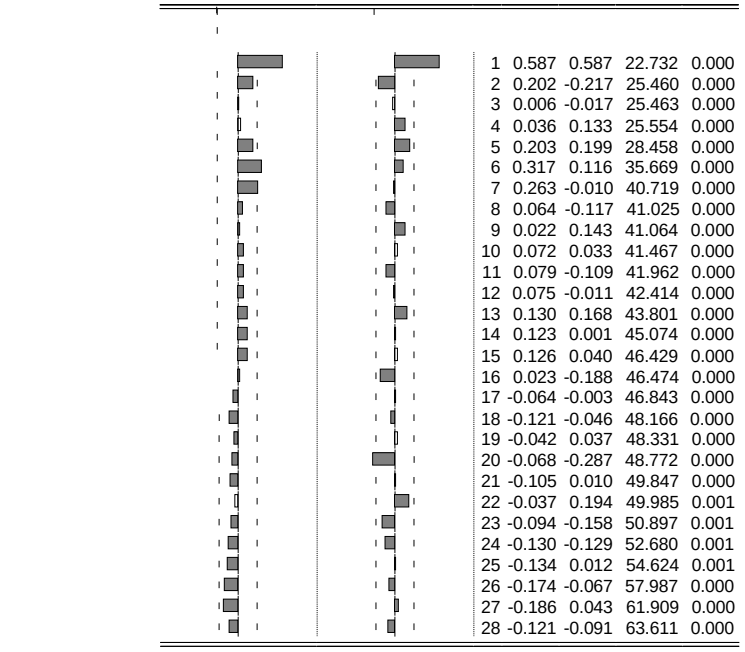
Further, the first-order difference is performed and a DLGDP sequence is obtained. The resultsof the ADF test for the DLGDP sequence is given in Table 5.
It can be seen that ADF=-4.340237 is less than the three critical values of the test level. That is to say, the DLGDP sequence after the logarithmic change and the first-order difference isa stationary series, and the significance test of the stationarity is passed. It can be seen that the original GDP sequence is a first-order single-order sequence, that is, LGDP ~ I (1).

Model Identification

With the EViews software, the autocorrelation and partial autocorrelation function graphsof the DLGDP series are plotted in Figure 5.

Date: 12/17/22
Time: 02:04 Sample:
1952 2018

Included observations: 63



	AC	PAC	Q-Stat	Prob
1	0.587	0.587	22.732	0.000
2	0.202	-0.217	25.460	0.000
3	0.006	-0.017	25.463	0.000
4	0.036	0.133	25.554	0.000
5	0.203	0.199	28.458	0.000
6	0.317	0.116	35.669	0.000
7	0.263	-0.010	40.719	0.000
8	0.064	-0.117	41.025	0.000
9	0.022	0.143	41.064	0.000
10	0.072	0.033	41.467	0.000
11	0.079	-0.109	41.962	0.000
12	0.075	-0.011	42.414	0.000
13	0.130	0.168	43.801	0.000
14	0.123	0.001	45.074	0.000
15	0.126	0.040	46.429	0.000
16	0.023	-0.188	46.474	0.000
17	-0.064	-0.003	46.843	0.000
18	-0.121	-0.046	48.166	0.000
19	-0.042	0.037	48.331	0.000
20	-0.068	-0.287	48.772	0.000
21	-0.105	0.010	49.847	0.000
22	-0.037	0.194	49.985	0.001
23	-0.094	-0.158	50.897	0.001
24	-0.130	-0.129	52.680	0.001
25	-0.134	0.012	54.624	0.001
26	-0.174	-0.067	57.987	0.000
27	-0.186	0.043	61.909	0.000
28	-0.121	-0.091	63.611	0.000

Figure 5. Autocorrelation and partial autocorrelation function graphs of the DLGDP series.

It can be seen from Figure 5 that the autocorrelation coefficient of the DLGDP sequence is significantly non-zero when the lag order is 1. And it is basically in the confidence band whenthe lag order is greater than 1, so q can be taken 1. The partial autocorrelation coefficient is significantly nonzero when the lag order is equal to 1, and it is also significantly different from0 when the lag order is 2, so p=1 or p=2 can be considered. Considering that the judgment is very subjective, to establish a more accurate model, the range of values of p and q is appropriately relaxed, and multiple ARMA (p, q) models are established. The order with 0, 1,2 in autoregressive moving average pre-estimation is performed on the processed sample data. Table 5 lists the test results of ARMA (p, q) for different parameters. Adjusted R- squared, AIC value, SC value and S.E. of regression are all important criteria for selecting models. The AIC criterion and the SC criterion are mainly used for ranking, and select the optimal model. Generally, the larger the coefficient of determination, the smaller the AIC value and the SC value, and the residual variance. The corresponding ARMA (p,q) model is superior.

Table 6. Test results of ARMA (p,q).

(p,q)	Adjusted R-squared	AIC	SC	S.E. of regression
(0,1)	0.312800	-2.520025	-2.417971	0.066851
(0,2)*	0.016962	-2.166110	-2.064056	0.079956
(1,0)	0.330593	-2.545679	-2.443625	0.065980
(1,1)*	0.353535	-2.564026	-2.427954	0.064839
(1,2)	0.338601	-2.542001	-2.405929	0.065584
(2,0)*	0.010211	-2.160068	-2.058014	0.080230

(2,1)	0.336333	-2.538841	-2.402769	0.065696
(2,2)	0.153379	-2.236239	-2.100167	0.074201

It should be noted that, while the AIC and SC values are commonly used to pick the optimal ARMA model. However, the minimal AIC and SC values are insufficient for determining the best ARMA model. The strategy utilized in this study is to first create a model with the lowest AIC and SC values, then run a parameter significance test and a residual randomness test on the estimation result. If it passes the test, the model is considered optimum; if it fails,the second least AIC value and SC value are chosen, and the relevant statistical test is run. Andso on, until the best model is found. Table 6 shows the model. Finally, it is preferable to prefer the ARMA(1, 0) model.

Model establishment and inspection

The estimated results with the ARIMA model are as follows:

Table 7. Estimation results of the ARIMA model

Dependent Variable: D(LGDP)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 12/08/22 Time: 08:21
Sample: 1953 2015
Included observations: 63
Convergence achieved after 4 iterations
~~Coefficient covarian~~ce computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.110597	0.020849	5.304763	0.0000
AR(1)	0.590915	0.113374	5.212098	0.0000
SIGMASQ	0.004146	0.000679	6.102246	0.0000

R-squared	0.352187	Mean dependent var	0.109798
Adjusted R-squared	0.330593	S.D. dependent var	0.080642
S.E. of regression	0.065980	Akaike info criterion	-2.545679
Sum squared resid	0.261198	Schwarz criterion	-2.443625

Log likelihood	83.18890
F-statistic	16.30964
Prob(F-statistic)	0.000002
Inverted AR Roots	.59
Hannan-Quinn criter.	2.505541
Durbin-Watson stat	1.706741

The final model of the LGDP sequence is ARIMA (1, 1, 0), and Equation (3) displays the specific form of the model. Here the data in parentheses below the equation is the t-test statistic of the corresponding estimate value.
D(LGDP) = 0.110597405527 + [AR(1)=0.590914922765,UNCOND,ESTSMPL="19532015"]
The estimated value of the variance of the corresponding error term is 0.065980

It can be seen from the t statistic of the model coefficients and its P value that the parameter estimates of all explanatory variables of the model are significant at the significance level of 0.01. The model is used to fit the DLGDP data, and the result is shown in Figure 4. In the figure, the actual data is given by the solid line, and the upper and lower dotted lines correspond tothe fitted values and residual of the model.

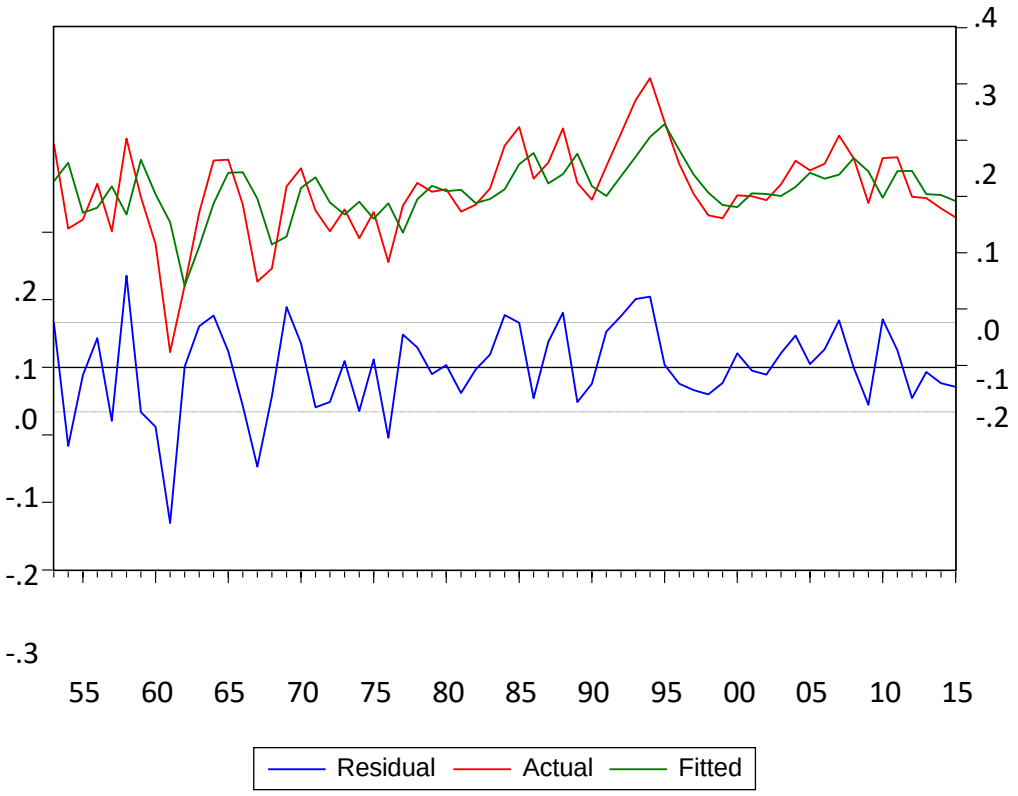


Figure 6. Actual series, fitted series and residual series of the DLGDP sequence.

A white noise test is performed on the residual after fitting the ARIMA (1, 1, 0) model. The

autocorrelation and partial autocorrelation function graphs of the residual series are shown in Figure 6. It can be seen that the residual is a white noise, indicating that the model isvalid.

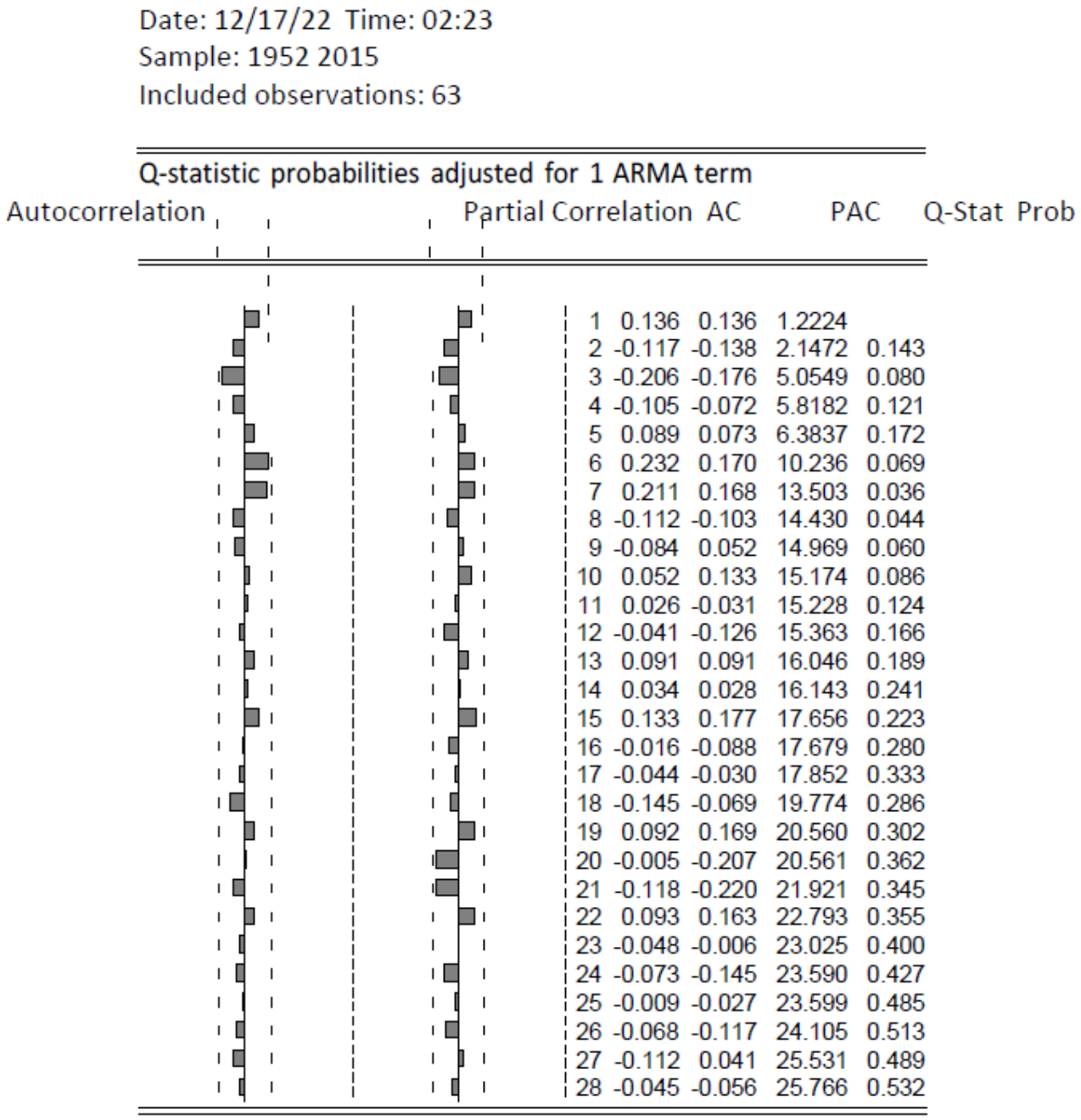


Figure 7. Autocorrelation and partial autocorrelation function graphs of the residual series.

Data forecasting

Economic forecasts are quantitative estimates of economic and non-economic variables overa period specific time. Forecasting methods are divided according to the approved methodological standard into two main parts. The methods are non-systematic and depend on experience, experience and self-estimation using symmetry methods Comparison and opinions of relevant and experienced. The second section is the systematic methods that depend on Methods that are knowledgeable and characterized by objectivity and the insignificance of the influence of subjective factors so that they give the same information Used and interpreted any

phenomenon by different people the same results. Styles are divided systems into causal and non-causal models. Non-causal models include trend projection General and time series decomposition, which is one of the most accurate and widely used methods.

First, the model is utilized to examine the fitting impact using the 2015 GDP value. In 2015, the predicted value is 705847.6 billion RMB. The exact figure is 685506 billion RMB, with a relative error of 2.97%. The prediction number is quite close to the actual outcome, showingthat the model has a strong fitting effect.

EViews software's graphical interface use Dynamic forecast mode to forecast GDP numbers from 2016 to 2018. The findings are shown in the table below.

In 2016 and 2017, the National Bureau of Statistics of China did not publicly disclose updatedGDP numbers. According to the National Bureau of Statistics' official website, the verificationvalue of GDP in 2016 is 743585 billion RMB, while the preliminary value of GDP in 2017 is 827122 billion RMB. In this case, the relative errors in GDP projections are 0.09% in 2016 and1.17% in 2017.

Table 8. China GDP forecast from 2016 to 2018.

Year	**2016**	**2017**	**2018**
Forecast GDP (hundred million RMB)	744216.9	817405.2	903980.5
Release GDP (hundred million RMB)	743585	827122	/
Relative error (%)	0.09	1.17	/

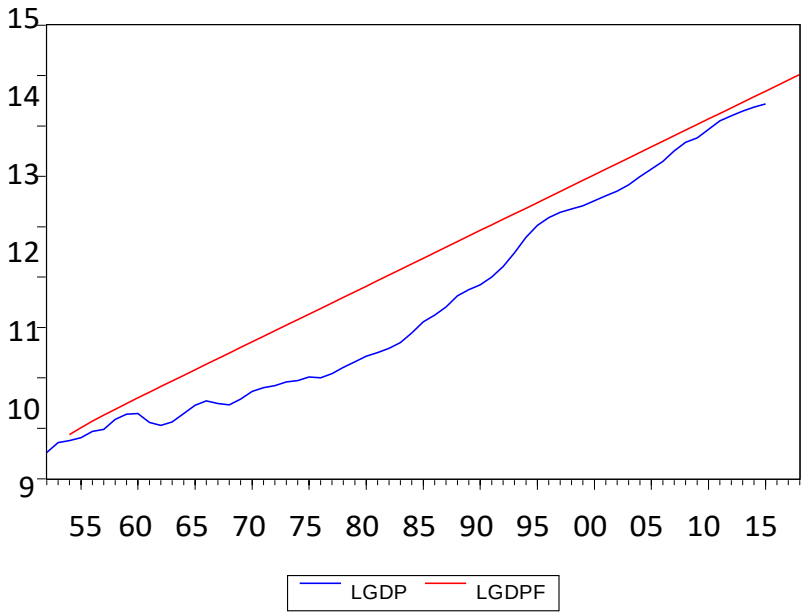


Figure 8 China GDP forecast from 2016 to 2018.

CONCLUSION

ARIMA model forecast is a rather sophisticated time series prediction approach. It is capableof accurately describing the dynamic change rules. Under specific conditions, it may be utilized to do statistical analysis and forecast for time series. Specially, the model is suitable for short- term predictions. Large deviations occur when the forecasting time scale is long. Based on EViews software, this work gives time series modeling and forecasting with the ARIMA model. It should be emphasized that for a given time series that is sensitive to several causes, model projections

that depend purely on current values and previous data might occasionally deviate from reality. Also In this study, we use ARIMA model in trying to model the Chinese GDP. After stationarity was checked using Augmented Dick Fuller test, correlogram was used in identifying the most suitable model with minimum value of Akaike Information Criterion andthis result was used in forecasting with making the model a reasonable model for forecasting future data, after the residual of the model was checked using Ljung-Box that shows no sign of autocorrelation in the residual. The ARIMA (1, 1, 0) was considered the most appropriate model for the data since the model diagnostic tests showed significant parameter estimates and randomness in the plot of the residuals. Out of sample forecast wasgenerated for 2016 through2018 using Eviews version 11.

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