```
113  0  OUTPUT ACTIVATE ARIMAModelOutput.
113  0 M>  OUTPUT ACTIVATE ARIMAModelOutput.
114  0  TITLE 'ARIMA Model'.
114  0 M>  TITLE 'ARIMA Model'.
```

```
 115  0  GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and Fo
recasting\ARIMA Model\dataset.csv' /ENCODING='UTF8' /D
            ELCASE=LINE /DELIMITERS=',' /QUALIFIER='"' /ARRANGEMENT=DELIMITED
/FIRSTCASE=2
 115  0 M>  GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and
 Forecasting\ARIMA Model\dataset.csv' /ENCODING='UTF8'
               /DELCASE=LINE /DELIMITERS=',' /QUALIFIER='"' /ARRANGEMENT=DELI
MITED /FIRSTCASE=2
 116  0   /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A
8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16 gua
            rdian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoolsup A
8 famsup A8 paid A8 activities A8 nursery A8 higher A8
             internet A8 romantic A8 famrel F8.0 freetime F8.0 goout F8.0 Dalc
 F8.0 Walc F8.0 health F8.0 absences F8.0 G1 F8.0 G2 F
            8.0 G3 F8.0.
 116  0 M>   /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatu
s A8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16
              guardian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoo
lsup A8 famsup A8 paid A8 activities A8 nursery A8 hig
              her A8 internet A8 romantic A8 famrel F8.0 freetime F8.0 goout
F8.0 Dalc F8.0 Walc F8.0 health F8.0 absences F8.0 G1
              F8.0 G2 F8.0 G3 F8.0.
 117  0  DATASET NAME ARIMAModelData.
 117  0 M>  DATASET NAME ARIMAModelData.
 118  0  COMPUTE time_index=$CASENUM.
 118  0 M>  COMPUTE time_index=$CASENUM.
 119  0  EXECUTE.
 119  0 M>  EXECUTE.
 120  0  * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
 120  0 M>  * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
 121  0  COMPUTE dg3=G3-LAG(G3).
 121  0 M>  COMPUTE dg3=G3-LAG(G3).
 122  0  COMPUTE d_l1=LAG(dg3,1).
 122  0 M>  COMPUTE d_l1=LAG(dg3,1).
 123  0  EXECUTE.
 123  0 M>  EXECUTE.
 124  0  REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT dg3 /METH
OD=ENTER time_index d_l1 /SAVE PRED(arima_diff_fit) RE
            SID(arima_resid).
```

```
 124  0 M>  REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT dg3 /M
ETHOD=ENTER time_index d_l1 /SAVE PRED(arima_diff_fit)
               RESID(arima_resid).
```

Regression

Notes

Output Created		18-JUL-2026 15:50:06
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\ARIMA Model\dataset.csv
	Active Dataset	ARIMAModelData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT dg3 /METHOD=ENTER time_index d_l1 /SAVE PRED(arima_diff_fit) RESID(arima_resid).
Resources	Processor Time	00:00:00.13
	Elapsed Time	00:00:00.31
	Memory Required	4384 bytes
	Additional Memory Required for Residual Plots	0 bytes

Notes

Variables Created or Modified	arima_diff_fit	Unstandardized Predicted Value
	arima_resid	Unstandardized Residual

[ARIMAModelData]

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	d_l1, time_index[b]	.	Enter

a. Dependent Variable: dg3

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.532[a]	.283	.281	3.49256

a. Predictors: (Constant), d_l1, time_index

b. Dependent Variable: dg3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3100.516	2	1550.258	127.092	.000[b]
	Residual	7855.484	644	12.198		
	Total	10956.000	646			

a. Dependent Variable: dg3

b. Predictors: (Constant), d_l1, time_index

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.015	.276		.053	.958
	time_index	-4.755E-5	.001	-.002	-.065	.948
	d_l1	-.532	.033	-.532	-15.943	.000

Coefficients[a]

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-.528	.557
	time_index	-.001	.001
	d_l1	-.598	-.466

a. Dependent Variable: dg3

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-9.5902	10.0923	.0000	2.19079	647
Residual	-17.45425	15.01585	.00000	3.48715	647
Std. Predicted Value	-4.378	4.607	.000	1.000	647
Std. Residual	-4.998	4.299	.000	.998	647

a. Dependent Variable: dg3

```
 125  0  * END METHOD-SPECIFIC SPSS WORKFLOW.
 125  0 M>  * END METHOD-SPECIFIC SPSS WORKFLOW.
 126  0  SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\AR
IMA Model\SPSS_Output\sav\arima-model_spss_ready_data.
           sav' /COMPRESSED.
 126  0 M>  SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting
\ARIMA Model\SPSS_Output\sav\arima-model_spss_ready_da
              ta.sav' /COMPRESSED.
 127  0  ECHO 'ARIMA Model'.
 127  0 M>  ECHO 'ARIMA Model'.
ARIMA Model
```

```
 128  0  ECHO 'Method type: integrated_time_series_model'.
 128  0 M>  ECHO 'Method type: integrated_time_series_model'.
Method type: integrated_time_series_model
 129  0  ECHO 'Design: ARIMA(1,1,1) with drift fitted to G3 and a 12-step fore
cast.'.
 129  0 M>  ECHO 'Design: ARIMA(1,1,1) with drift fitted to G3 and a 12-step f
orecast.'.
Design: ARIMA(1,1,1) with drift fitted to G3 and a 12-step forecast.
 130  0  ECHO 'Formula: (1-phi*B)(1-B)y_t=c+(1+theta*B)e_t'.
 130  0 M>  ECHO 'Formula: (1-phi*B)(1-B)y_t=c+(1+theta*B)e_t'.
Formula: (1-phi*B)(1-B)y_t=c+(1+theta*B)e_t
 131  0  ECHO 'Series order: source-row order'.
 131  0 M>  ECHO 'Series order: source-row order'.
Series order: source-row order
 132  0  ECHO 'n_series = 649'.
 132  0 M>  ECHO 'n_series = 649'.
n_series = 649
 133  0  ECHO 'order_p = 1'.
 133  0 M>  ECHO 'order_p = 1'.
order_p = 1
 134  0  ECHO 'order_d = 1'.
 134  0 M>  ECHO 'order_d = 1'.
order_d = 1
 135  0  ECHO 'order_q = 1'.
 135  0 M>  ECHO 'order_q = 1'.
order_q = 1
 136  0  ECHO 'aic = 3300.0581579714494'.
 136  0 M>  ECHO 'aic = 3300.0581579714494'.
aic = 3300.0581579714494
 137  0  ECHO 'bic = 3317.9537207568587'.
 137  0 M>  ECHO 'bic = 3317.9537207568587'.
bic = 3317.9537207568587
 138  0  ECHO 'ar_1 = 0.02846530396145195'.
 138  0 M>  ECHO 'ar_1 = 0.02846530396145195'.
ar_1 = 0.02846530396145195
 139  0  ECHO 'ma_1 = -0.9218160349311649'.
 139  0 M>  ECHO 'ma_1 = -0.9218160349311649'.
ma_1 = -0.9218160349311649
 140  0  ECHO 'forecast_12 = 10.452339043535897'.
```

```
 140  0 M>  ECHO 'forecast_12 = 10.452339043535897'.
forecast_12 = 10.452339043535897
 141  0  ECHO 'Cross-check status: pass'.
 141  0 M>  ECHO 'Cross-check status: pass'.
Cross-check status: pass
 142  0  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecas
ting\ARIMA Model\SPSS_Output\spv\arima-model_spss_outp
            ut.spv'.
 142  0 M>  OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Fore
casting\ARIMA Model\SPSS_Output\spv\arima-model_spss_o
               utput.spv'.
 143  0  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Time S
            eries Tests and Forecasting\ARIMA Model\SPSS_Output\pdf\arima-mode
l_spss_output.pdf'.
 143  0 M>  OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Tim
               e Series Tests and Forecasting\ARIMA Model\SPSS_Output\pdf\arim
a-model_spss_output.pdf'.
```