

```
961 0 OUTPUT ACTIVATE PhillipsPerronTestOutput.  
961 0 M> OUTPUT ACTIVATE PhillipsPerronTestOutput.  
962 0 TITLE 'Phillips Perron Test'.  
962 0 M> TITLE 'Phillips Perron Test'.
```

Phillips Perron Test

```
963 0 GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and Fo
recasting\Phillips Perron Test\dataset.csv' /ENCODING=
      'UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANGEMENT=D
ELIMITED /FIRSTCASE=2
963 0 M> GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and
Forecasting\Phillips Perron Test\dataset.csv' /ENCODI
      NG='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANGE
MENT=DELIMITED /FIRSTCASE=2
964 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.
964 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.
965 0 DATASET NAME PhillipsPerronTestData.
965 0 M> DATASET NAME PhillipsPerronTestData.
966 0 COMPUTE time_index=$CASENUM.
966 0 M> COMPUTE time_index=$CASENUM.
967 0 EXECUTE.
967 0 M> EXECUTE.
968 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
968 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
969 0 COMPUTE dg3=G3-LAG(G3).
969 0 M> COMPUTE dg3=G3-LAG(G3).
970 0 COMPUTE level_l1=LAG(G3).
970 0 M> COMPUTE level_l1=LAG(G3).
971 0 REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT dg3 /METH
OD=ENTER level_l1 /SAVE RESID(pp_e).
971 0 M> REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT dg3 /M
ETHOD=ENTER level_l1 /SAVE RESID(pp_e).
```

Regression

Phillips Perron Test

Notes

Output Created		18-JUL-2026 15:53:34
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Phillips Perron Test\dataset.csv
	Active Dataset	PhillipsPerronTestData
	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 level_11 /SAVE RESID (pp_e).
Resources	Processor Time	00:00:00.13
	Elapsed Time	00:00:00.25
	Memory Required	3920 bytes
	Additional Memory Required for Residual Plots	0 bytes
Variables Created or Modified	pp_e	Unstandardized Residual

[PhillipsPerronTestData]

Phillips Perron Test

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	level_l1 ^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	.636 ^a	.405	.404	3.17656

a. Predictors: (Constant), level_l1

b. Dependent Variable: dg3

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4437.520	1	4437.520	439.771	.000 ^b
	Residual	6518.480	646	10.091		
	Total	10956.000	647			

a. Dependent Variable: dg3

b. Predictors: (Constant), level_l1

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.646	.477		20.239	.000
	level_l1	-.810	.039	-.636	-20.971	.000

Phillips Perron Test

Coefficients^a

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	8.710	10.582
	level_l1	-.886	-.734

a. Dependent Variable: dg3

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-5.7454	9.6457	.0000	2.61889	648
Residual	-13.25456	8.35426	.00000	3.17410	648
Std. Predicted Value	-2.194	3.683	.000	1.000	648
Std. Residual	-4.173	2.630	.000	.999	648

a. Dependent Variable: dg3

```

972  0  COMPUTE e_l1=LAG(pp_e).
972  0 M>  COMPUTE e_l1=LAG(pp_e).
973  0  CORRELATIONS /VARIABLES=pp_e e_l1.
973  0 M>  CORRELATIONS /VARIABLES=pp_e e_l1.

```

Correlations

Phillips Perron Test

Notes

Output Created		18-JUL-2026 15:53:34
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Phillips Perron Test\dataset.csv
	Active Dataset	PhillipsPerronTestData
	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 for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=pp_e e_l1.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.19

Correlations

		Unstandardized Residual	e_l1
Unstandardized Residual	Pearson Correlation	1	-.041
	Sig. (2-tailed)		.303
	N	648	647
e_l1	Pearson Correlation	-.041	1
	Sig. (2-tailed)	.303	
	N	647	647

974 0 ECHO 'The long-run variance correction uses residual autocovariances without ADF lag augmentation'.

974 0 M> ECHO 'The long-run variance correction uses residual autocovariances without ADF lag augmentation'.

Phillips Perron Test

The long-run variance correction uses residual autocovariances without ADF lag augmentation

```
975 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
975 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
976 0 SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Phillips Perron Test\SPSS_Output\sav\phillips-perron-test_spss_ready_data.sav' /COMPRESSED.
976 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Phillips Perron Test\SPSS_Output\sav\phillips-perron-test_spss_ready_data.sav' /COMPRESSED.
977 0 ECHO 'Phillips Perron Test'.
977 0 M> ECHO 'Phillips Perron Test'.
```

Phillips Perron Test

```
978 0 ECHO 'Method type: hypothesis_test'.
978 0 M> ECHO 'Method type: hypothesis_test'.
Method type: hypothesis_test
```

```
979 0 ECHO 'Design: Phillips-Perron Z-t unit-root test with a constant and Newey-West long-run variance correction.'.
979 0 M> ECHO 'Design: Phillips-Perron Z-t unit-root test with a constant and Newey-West long-run variance correction.'.
Design: Phillips-Perron Z-t unit-root test with a constant and Newey-West long-run variance correction.
```

```
980 0 ECHO 'Formula:  $Z_t = t_{\rho} - (\lambda^2 - \gamma_0) / (2 * \lambda) * \sqrt{n^2 / \sum(e_t^2)}$ '.
980 0 M> ECHO 'Formula:  $Z_t = t_{\rho} - (\lambda^2 - \gamma_0) / (2 * \lambda) * \sqrt{n^2 / \sum(e_t^2)}$ '.
```

Formula: $Z_t = t_{\rho} - (\lambda^2 - \gamma_0) / (2 * \lambda) * \sqrt{n^2 / \sum(e_t^2)}$

```
981 0 ECHO 'Series order: source-row order'.
981 0 M> ECHO 'Series order: source-row order'.
```

Series order: source-row order

```
982 0 ECHO 'pp_z_t = -26.35604192639241'.
982 0 M> ECHO 'pp_z_t = -26.35604192639241'.
pp_z_t = -26.35604192639241
```

```
983 0 ECHO 'normal_reference_p_value = 2.1879733188608278e-153'.
983 0 M> ECHO 'normal_reference_p_value = 2.1879733188608278e-153'.
normal_reference_p_value = 2.1879733188608278e-153
```

```
984 0 ECHO 'rho_hat = 0.1899378922808976'.
984 0 M> ECHO 'rho_hat = 0.1899378922808976'.
rho_hat = 0.1899378922808976
```

Phillips Perron Test

```
985 0 ECHO 'ols_unit_root_t = -20.970716572822255'.
985 0 M> ECHO 'ols_unit_root_t = -20.970716572822255'.
ols_unit_root_t = -20.970716572822255
986 0 ECHO 'newey_west_bandwidth = 6'.
986 0 M> ECHO 'newey_west_bandwidth = 6'.
newey_west_bandwidth = 6
987 0 ECHO 'short_run_variance = 10.059382367152402'.
987 0 M> ECHO 'short_run_variance = 10.059382367152402'.
short_run_variance = 10.059382367152402
988 0 ECHO 'long_run_variance = 15.310252450210815'.
988 0 M> ECHO 'long_run_variance = 15.310252450210815'.
long_run_variance = 15.310252450210815
989 0 ECHO 'Cross-check status: pass'.
989 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
990 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecas
ting\Phillips Perron Test\SPSS_Output\spv\phillips-per
ron-test_spss_output.spv'.
990 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Fore
casting\Phillips Perron Test\SPSS_Output\spv\phillips-
perron-test_spss_output.spv'.
991 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Time S
eries Tests and Forecasting\Phillips Perron Test\SPSS_Output\pdf\p
hillips-perron-test_spss_output.pdf'.
991 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Tim
e Series Tests and Forecasting\Phillips Perron Test\SPSS_Output
\pdf\phillips-perron-test_spss_output.pdf'.
```