

```
466 0 OUTPUT ACTIVATE ExponentialSmoothingOutput.  
466 0 M> OUTPUT ACTIVATE ExponentialSmoothingOutput.  
467 0 TITLE 'Exponential Smoothing'.  
467 0 M> TITLE 'Exponential Smoothing'.
```

Exponential Smoothing

```
468 0 GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and Fo
recasting\Exponential Smoothing\dataset.csv' /ENCODING
      ='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANGEMENT=
DELIMITED /FIRSTCASE=2
468 0 M> GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and
Forecasting\Exponential Smoothing\dataset.csv' /ENCOD
      ING='UTF8' /DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANG
EMENT=DELIMITED /FIRSTCASE=2
469 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.
469 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.
470 0 DATASET NAME ExponentialSmoothingData.
470 0 M> DATASET NAME ExponentialSmoothingData.
471 0 COMPUTE time_index=$CASENUM.
471 0 M> COMPUTE time_index=$CASENUM.
472 0 EXECUTE.
472 0 M> EXECUTE.
473 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
473 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
474 0 COMPUTE alpha=.30.
474 0 M> COMPUTE alpha=.30.
475 0 COMPUTE damp=.90.
475 0 M> COMPUTE damp=.90.
476 0 COMPUTE level=.30*G3+.70*LAG(G3).
476 0 M> COMPUTE level=.30*G3+.70*LAG(G3).
477 0 COMPUTE trend=level-LAG(level).
477 0 M> COMPUTE trend=level-LAG(level).
478 0 COMPUTE damped_fit=LAG(level)+damp*LAG(trend).
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Exponential Smoothing

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478  0 M> COMPUTE damped_fit=LAG(level)+damp*LAG(trend).
479  0 COMPUTE damped_error=G3-damped_fit.
479  0 M> COMPUTE damped_error=G3-damped_fit.
480  0 DESCRIPTIVES VARIABLES=level trend damped_fit damped_error /STATISTIC
S=MEAN STDDEV MIN MAX.
480  0 M> DESCRIPTIVES VARIABLES=level trend damped_fit damped_error /STATIS
TICS=MEAN STDDEV MIN MAX.

```

Descriptives

Notes

Output Created		18-JUL-2026 15:52:12
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Exponential Smoothing\dataset.csv
	Active Dataset	ExponentialSmoothingData
	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	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=level trend damped_fit damped_error /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.07

[ExponentialSmoothingData]

Exponential Smoothing

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
level	648	.00	18.30	11.9074	2.62602
trend	647	-11.20	10.80	-.0011	2.45902
damped_fit	646	-10.08	25.92	11.9089	4.15618
damped_error	646	-16.96	25.08	-.0003	4.74801
Valid N (listwise)	646				

```

481 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
481 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
482 0 SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\Ex
ponential Smoothing\SPSS_Output\sav\exponential-smooth
ing_spss_ready_data.sav' /COMPRESSED.
482 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting
\Exponential Smoothing\SPSS_Output\sav\exponential-smo
othing_spss_ready_data.sav' /COMPRESSED.
483 0 ECHO 'Exponential Smoothing'.
483 0 M> ECHO 'Exponential Smoothing'.
Exponential Smoothing
484 0 ECHO 'Method type: forecasting_model'.
484 0 M> ECHO 'Method type: forecasting_model'.
Method type: forecasting_model
485 0 ECHO 'Design: Damped additive-trend exponential-smoothing forecast ev
aluated on the final 10 percent.'.
485 0 M> ECHO 'Design: Damped additive-trend exponential-smoothing forecast
evaluated on the final 10 percent.'.
Design: Damped additive-trend exponential-smoothing forecast evaluated on the
final 10 percent.
486 0 ECHO 'Formula: l_t=alpha*y_t+(1-alpha)(l_(t-1)+phi*b_(t-1)); b_t=beta
*(l_t-l_(t-1))+(1-beta)phi*b_(t-1)'.
486 0 M> ECHO 'Formula: l_t=alpha*y_t+(1-alpha)(l_(t-1)+phi*b_(t-1)); b_t=b
eta*(l_t-l_(t-1))+(1-beta)phi*b_(t-1)'.
Formula: l_t=alpha*y_t+(1-alpha)(l_(t-1)+phi*b_(t-1)); b_t=beta*(l_t-l_(t-1))+
(1-beta)phi*b_(t-1)
487 0 ECHO 'Series order: source-row order'.
487 0 M> ECHO 'Series order: source-row order'.
Series order: source-row order
488 0 ECHO 'alpha = 0.1168871446890233'.

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Exponential Smoothing

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488 0 M> ECHO 'alpha = 0.1168871446890233'.
alpha = 0.1168871446890233
489 0 ECHO 'beta = 0.0'.
489 0 M> ECHO 'beta = 0.0'.
beta = 0.0
490 0 ECHO 'damping_phi = 0.8'.
490 0 M> ECHO 'damping_phi = 0.8'.
damping_phi = 0.8
491 0 ECHO 'holdout_mae = 5.071332218083546'.
491 0 M> ECHO 'holdout_mae = 5.071332218083546'.
holdout_mae = 5.071332218083546
492 0 ECHO 'holdout_rmse = 5.906090992909757'.
492 0 M> ECHO 'holdout_rmse = 5.906090992909757'.
holdout_rmse = 5.906090992909757
493 0 ECHO 'forecast_horizon = 65'.
493 0 M> ECHO 'forecast_horizon = 65'.
forecast_horizon = 65
494 0 ECHO 'Cross-check status: pass'.
494 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
495 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecas
ting\Exponential Smoothing\SPSS_Output\spv\exponential
-smoothing_spss_output.spv'.
495 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Fore
casting\Exponential Smoothing\SPSS_Output\spv\exponent
ial-smoothing_spss_output.spv'.
496 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Time S
eries Tests and Forecasting\Exponential Smoothing\SPSS_Output\pdf\
exponential-smoothing_spss_output.pdf'.
496 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Tim
e Series Tests and Forecasting\Exponential Smoothing\SPSS_Outpu
t\pdf\exponential-smoothing_spss_output.pdf'.
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