

QUICK START GUIDE

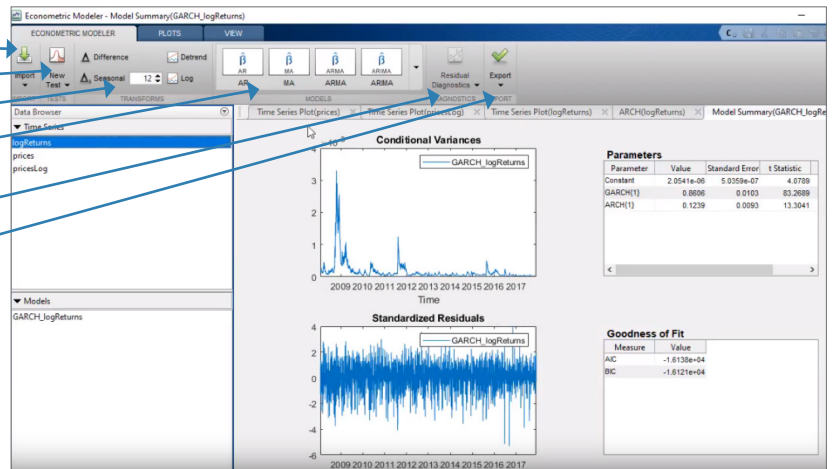
Time Series Analysis with MATLAB® and Econometrics Toolbox™

This reference shows common use cases but is not comprehensive.

The **>>** icon provides a link to relevant sections of the documentation.

Analyze Time Series Using the Econometric Modeler App

- Import data
- Conduct a specification test
- Transform data
- Select models
- Perform model diagnostics
- Share session results:
 - Export variables
 - Generate functions and reports



Econometric Modeler App Overview **>>**

Data Transformation

Prices ↔ Returns

```
Returns = price2ret(Prices); >>
Prices = ret2price>Returns); >>
```

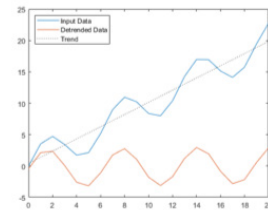
First-Order Differencing **>>**

```
dy = diff(y);
```

$$\Delta y_t = y_t - y_{t-1}$$

Detrending **>>**

```
y = detrend(y);
```



Data Visualization

ACF Plot **>>**

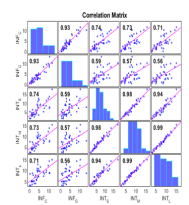
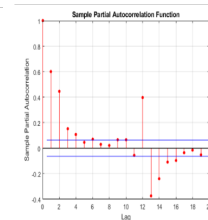
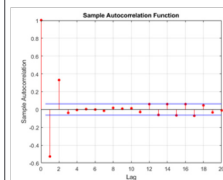
```
autocorr(y);
```

PACF Plot **>>**

```
parcorr(y);
```

Correlation Plot **>>**

```
corrplot(X);
```



Model Comparisons

Akaike or Bayesian Information Criteria

```
[aic,bic] = aicbic(logL,numParam,numObs); >>
```

Learn more: mathworks.com/help/econ

Specification Tests

Stationarity

`[h,pValue] = testName(y);`

<code>adftest</code>	Augmented Dickey-Fuller test
<code>kpsstest</code>	KPSS test for stationarity
<code>lmctest</code>	Leybourne-McCabe stationarity test
<code>pptest</code>	Phillips-Perron test for one unit root
<code>vratiotest</code>	Variance ratio test for random walk

Heteroscedasticity

Engle test

`[h,pValue] = archtest(residual);`

Correlation

Ljung-Box Q-Test for autocorrelation

`[h,pValue] = lbqtest(residual);`

Belsley Collinearity Diagnostics

`collintest(X)`

Cointegration

<code>egcitest</code>	Engle-Granger cointegration test
<code>jcitest</code>	Johansen cointegration test
<code>jcontest</code>	Johansen constraint test

Causality

Block-wise Granger causality and block exogeneity tests

`[h,pValue] = gctest(Y1,Y2);`

Conditional Variance Models

GARCH, EGARCH, and GJR

Create Models >>

`Mdl = garch(p,q);`

`Mdl = egarch(p,q);`

`Mdl = gjr(p,q);`

Estimate / Fit

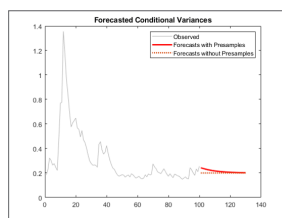
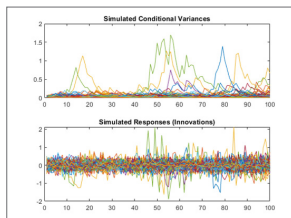
`[EstMdl,EstParamCov,logL,info] = estimate(Mdl,Y);`

Simulate

`[V,Y] = simulate(EstMdl,numObs);`

Forecast

`V = forecast(EstMdl,numperiods,Y0);`



Conditional Mean Models

ARMA, ARIMA, and ARIMAX

Create Models >>

`Mdl = arima(p,D,q);`

Estimate/Fit

`[EstMdl,EstParamCov,logL,info] = estimate(Mdl,Y);`

Impulse

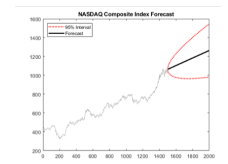
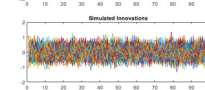
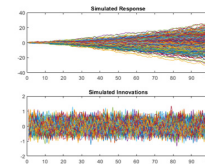
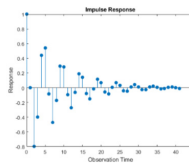
`impulse(Mdl);`

Simulate

`[Y,E] = ...
simulate ...
(EstMdl,numObs);`

Forecast

`[Y,YMSE] = ...
forecast ...
EstMdl,numperiods,Y0);`



Multivariate Model

Vector Autoregression (VAR)
and Vector-Error Correction (VEC)

Create Models >>

VAR

`Mdl = varm(numseries,numlags);`

VEC

`Mdl = vecm(numseries,rank,numlags);`

Estimate/Fit

`[EstMdl,EstSE,logL,E] = estimate(Mdl,Y);`

Investigate

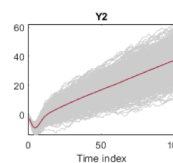
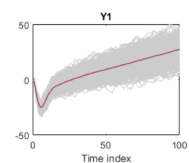
`h = gctest(Mdl); % For VAR model only`

`Response = irf(Mdl);`

`Decomposition = fevd(Mdl);`

Simulate

`[Y,E] = simulate(EstMdl,numObs);`



Forecast

`[Y,YMSE] = forecast(EstMdl,numperiods,Y0);`

