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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

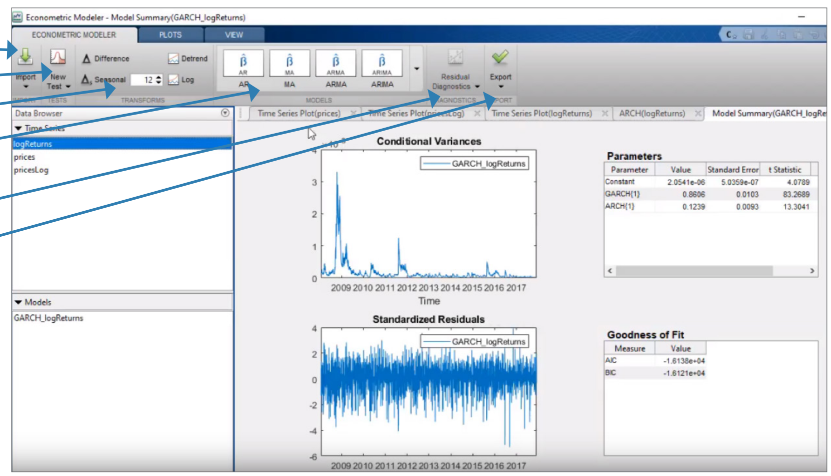
Transform data

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);
```

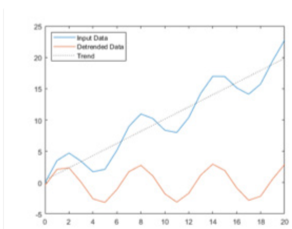
First-Order Differencing >>

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

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

Detrending >>

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



Data Visualization

ACF Plot >>

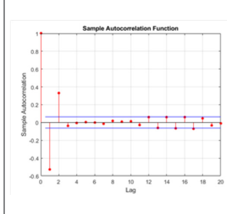
```
autocorr(y);
```

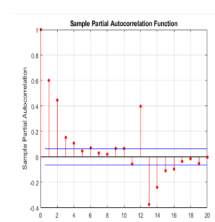
PACF Plot >>

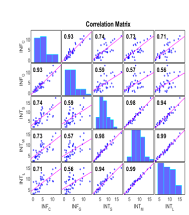
```
parcorr(y);
```

Correlation Plot >>

```
corrplot(X);
```







Model Comparisons

Akaike or Bayesian Information Criteria

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

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Specification Tests

Stationarity

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

`adftest`	Augmented Dickey-Fuller test
`kpsstest`	KPSS test for stationarity
`lmctest`	Leybourne-McCabe stationarity test
`pptest`	Phillips-Perron test for one unit root
`vratiotest`	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

`egcitest`	Engle-Granger cointegration test
`jcitest`	Johansen cointegration test
`jcontest`	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

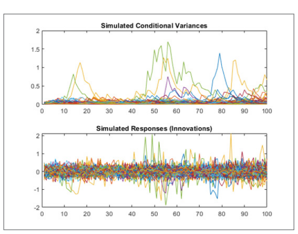
```
Mdl = garch(p,q);
Mdl = egarch(p,q);
Mdl = gjr(p,q);
```

Estimate / Fit

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

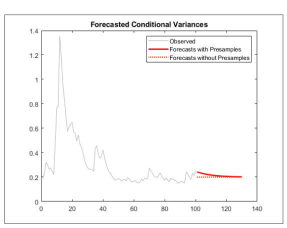
Simulate

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



Forecast

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



Conditional Mean Models
ARMA, ARIMA, and ARIMAX

Create Models

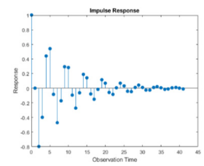
```
Mdl = arima(p,D,q);
```

Estimate/Fit

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

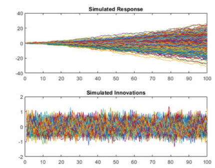
Impulse

```
impulse(Mdl);
```



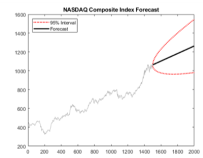
Simulate

```
[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

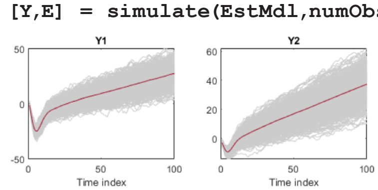
```
[EstMdl,EstSE,logL,E] = estimate(Mdl,Y);
```

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);
```