

## Postestimation commands

The following standard postestimation commands are available after `mgarch ccc`:

Command	Description
<code>contrast</code>	contrasts and ANOVA-style joint tests of parameters
<code>estat ic</code>	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, and BIC, respectively)
<code>estat summarize</code>	summary statistics for the estimation sample
<code>estat vce</code>	variance–covariance matrix of the estimators (VCE)
<code>estimates</code>	cataloging estimation results
<code>etable</code>	table of estimation results
<code>forecast</code>	dynamic forecasts and simulations
<code>lincom</code>	point estimates, standard errors, testing, and inference for linear combinations of parameters
<code>lrtest</code>	likelihood-ratio test
<code>margins</code>	marginal means, predictive margins, marginal effects, and average marginal effects
<code>marginsplot</code>	graph the results from margins (profile plots, interaction plots, etc.)
<code>nlcom</code>	point estimates, standard errors, testing, and inference for nonlinear combinations of parameters
<code>predict</code>	linear predictions, residuals, variances, correlations
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>pwcompare</code>	pairwise comparisons of parameters
<code>test</code>	Wald tests of simple and composite linear hypotheses
<code>testnl</code>	Wald tests of nonlinear hypotheses

# predict

## Description for predict

predict creates a new variable containing predictions such as linear predictions and conditional variances, covariances, and correlations. All predictions are available as static one-step-ahead predictions or as dynamic multistep predictions, and you can control when dynamic predictions begin.

## Menu for predict

Statistics > Postestimation

## Syntax for predict

```
predict [type] { stub* | newvarlist } [if] [in] [ , statistic options ]
```

statistic	Description
Main	
xb	linear prediction; the default
residuals	residuals
variance	conditional variances and covariances
correlation	conditional correlations
These statistics are available both in and out of sample; type predict ... if e(sample) ... if wanted only for the estimation sample.	
options	Description
Options	
equation(eqnames)	names of equations for which predictions are made
dynamic(time_constant)	begin dynamic forecast at specified time

## Options for predict

Main

xb, the default, calculates the linear predictions of the dependent variables.

residuals calculates the residuals.

variance predicts the conditional variances and conditional covariances.

correlation predicts the conditional correlations.

Options

equation(eqnames) specifies the equation for which the predictions are calculated. Use this option to predict a statistic for a particular equation. Equation names, such as equation(income), are used to identify equations.

One equation name may be specified when predicting the dependent variable, the residuals, or the conditional variance. For example, specifying `equation(income)` causes `predict` to predict `income`, and specifying `variance equation(income)` causes `predict` to predict the conditional variance of `income`.

Two equations may be specified when predicting a conditional variance or covariance. For example, specifying `equation(income, consumption) variance` causes `predict` to predict the conditional covariance of `income` and `consumption`.

`dynamic(time_constant)` specifies when `predict` starts producing dynamic forecasts. The specified *time\_constant* must be in the scale of the time variable specified in `tsset`, and the *time\_constant* must be inside a sample for which observations on the dependent variables are available. For example, `dynamic(tq(2008q4))` causes dynamic predictions to begin in the fourth quarter of 2008, assuming that your time variable is quarterly; see [D] [Datetime](#). If the model contains exogenous variables, they must be present for the whole predicted sample. `dynamic()` may not be specified with `residuals`.

## margins

### Description for margins

`margins` estimates margins of response for linear predictions and conditional variances, covariances, and correlations. All predictions are available as static one-step-ahead predictions or as dynamic multi-step predictions, and you can control when dynamic predictions begin.

### Menu for margins

Statistics > Postestimation

### Syntax for margins

```
margins [marginlist] [ , options ]
margins [marginlist] , predict(statistic ...) [predict(statistic ...) ...] [options]
```

statistic	Description
default	linear predictions for each equation
xb	linear prediction for a specified equation
variance	conditional variances and covariances
correlation	conditional correlations
residuals	not allowed with margins

`xb` defaults to the first equation.

Statistics not allowed with `margins` are functions of stochastic quantities other than `e(b)`.

For the full syntax, see [R] [margins](#).

## Remarks and examples

We assume that you have already read [TS] **mgarch ccc**. In this entry, we use `predict` after `mgarch ccc` to make in-sample and out-of-sample forecasts.

### ► Example 1: Dynamic forecasts

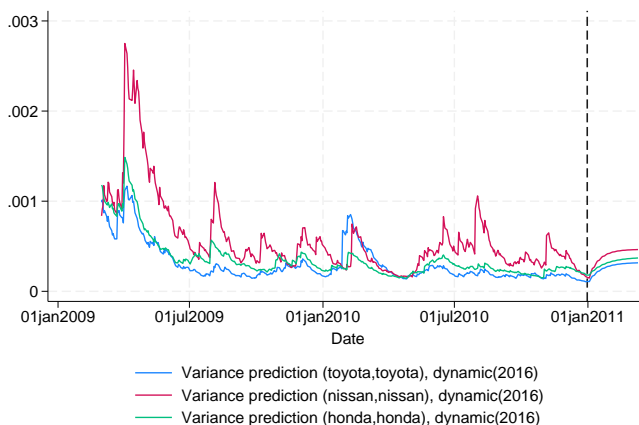
In this example, we obtain dynamic forecasts for the Toyota, Nissan, and Honda stock returns modeled in [example 2](#) of [TS] **mgarch ccc**. In the output below, we reestimate the parameters of the model, use `tsappend` (see [TS] **tsappend**) to extend the data, and use `predict` to obtain in-sample one-step-ahead forecasts and dynamic forecasts of the conditional variances of the returns. We graph the forecasts below.

```
. use https://www.stata-press.com/data/r19/stocks
(Data from Yahoo! Finance)

. quietly mgarch ccc (toyota nissan = , noconstant)
> (honda = L.nissan, noconstant), arch(1) garch(1)

. tsappend, add(50)

. predict H*, variance dynamic(2016)
```



Recent in-sample one-step-ahead forecasts are plotted to the left of the vertical line in the above graph, and the dynamic out-of-sample forecasts appear to the right of the vertical line. The graph shows the tail end of the huge increase in return volatility that took place in 2008 and 2009. It also shows that the dynamic forecasts quickly converge.



## Methods and formulas

All one-step predictions are obtained by substituting the parameter estimates into the model. The estimated unconditional variance matrix of the disturbances,  $\widehat{\Sigma}$ , is the initial value for the ARCH and GARCH terms. The postestimation routines recompute  $\widehat{\Sigma}$  using the prediction sample, the parameter estimates stored in `e(b)`, and (3) in *Methods and formulas* of [TS] **mgarch ccc**.

For observations in which the residuals are missing, the estimated unconditional variance matrix of the disturbances is used in place of the outer product of the residuals.

Dynamic predictions of the dependent variables use previously predicted values beginning in the period specified by `dynamic()`.

Dynamic variance predictions are implemented by substituting  $\widehat{\Sigma}$  for the outer product of the residuals beginning in the period specified in `dynamic()`.

## Also see

[TS] **mgarch ccc** — Constant conditional correlation multivariate GARCH model

[U] **20 Estimation and postestimation commands**

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