**sem option noxconditional — Computing means, etc., of observed exogenous variables**

**Syntax**
```
sem ... [, ... noxconditional ... ]
```

**Description**
`sem` has a `noxconditional` option that you may rarely wish to specify. The option is described below.

**Option**
`noxconditional` states that you wish to include the means, variances, and covariances of the observed exogenous variables among the parameters to be estimated by `sem`.

**Remarks and examples**
Remarks are presented under the following headings:
- What is x conditional?
- When to specify noxconditional
- Option forcexconditional (a technical note)

**What is x conditional?**
In many cases, `sem` does not include the means, variances, and covariances of observed exogenous variables among the parameters to be estimated. When `sem` omits them, the estimator of the model is said to be x conditional. Rather than estimating the values of the means, variances, and covariances, `sem` uses the separately calculated observed values of those statistics. `sem` does this to save time and memory.

`sem` does not use the x-conditional calculation when it would be inappropriate.

The `noxconditional` option prevents `sem` from using the x-conditional calculation. You specify `noxconditional` on the `sem` command:
```
 . sem ..., ... noxconditional
```

Do not confuse the x-conditional calculation with the assumption of conditional normality discussed in [SEM] intro 4. The x-conditional calculation is appropriate even when the assumption of conditional normality is inappropriate.
When to specify noxconditional

It is never inappropriate to specify the noxconditional option. Be aware, however:

1. If you are using the default method(ml), estimated point estimates and standard errors will be the same.

2. If you are using method(adf), estimated point estimates and standard errors will be slightly different, asymptotically equivalent, and there is no reason to prefer one set of estimates over the other.

3. If you are using method(mlmv), the situation is the same as in statement 1.

4. Regardless of the estimation method used, calculation of results will require more computer time and memory. The memory requirements increase quadratically with the total number of estimated parameters in your model. If you have $k_1$ observed exogenous variables and $k_2$ latent exogenous variables, the number of added parameters from noxconditional is $k_1 + k_1(k_1 + 1)/2 + k_1k_2$. The resulting total memory requirements can be so great as to require more memory than your computer can provide.

To make statements 1–4 true, there are two cases when sem specifies noxconditional for you:

1. sem defaults to noxconditional whenever you constrain a mean, variance, or covariance of an observed exogenous variable. For example,

   . sem ..., ... means(x1@m x2@m)
   . sem ..., ... var(x1@v x2@v)
   . sem ..., ... cov(x1*x2@c x1*x3@c)
   . sem ..., ... covstruct(_OEx, diagonal)

   See [SEM] sem and gsem path notation and [SEM] sem and gsem option covstructure().

2. sem defaults to noxconditional whenever you use method(mlmv) and there are missing values among the observed exogenous variables.

There are only three reasons for you to specify the noxconditional option:

1. Specify noxconditional if you subsequently wish to test means, variances, or covariances of observed exogenous variables with postestimation commands. For example,

   . sem ..., ... noxconditional
   . sem, coeflegend
   . test _b[means(x1):_cons] == _b[means(x2)_cons]

2. Specify noxconditional if you are fitting a model with the group() option.

3. Specify noxconditional if you also specify the ginvariant() option, and you want the ginvariant() classes meanex, covex, or all to include the observed exogenous variables. For example,

   . sem ..., ... by(agegrp) ginvariant(all) noxconditional

You may also wish to specify noxconditional when comparing results with those from other packages. Many packages use the noxconditional approach when using an estimation method other than maximum likelihood (ML). Correspondingly, most packages use the x-conditional calculation when using ML.
Option forcexconditional (a technical note)

In addition to noxconditional, sem has a forcexconditional option:

```
sem ... [ , ... forcexconditional ... ]
```

This option turns off sem’s switching away from the x-conditional calculation when that is required. Do not specify this option unless you are exploring the behavior of x-conditional calculation in cases where it is theoretically inappropriate.

Also see

[SEM] sem — Structural equation model estimation command