

Introduction to the Stata -margins- Command

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BGSU

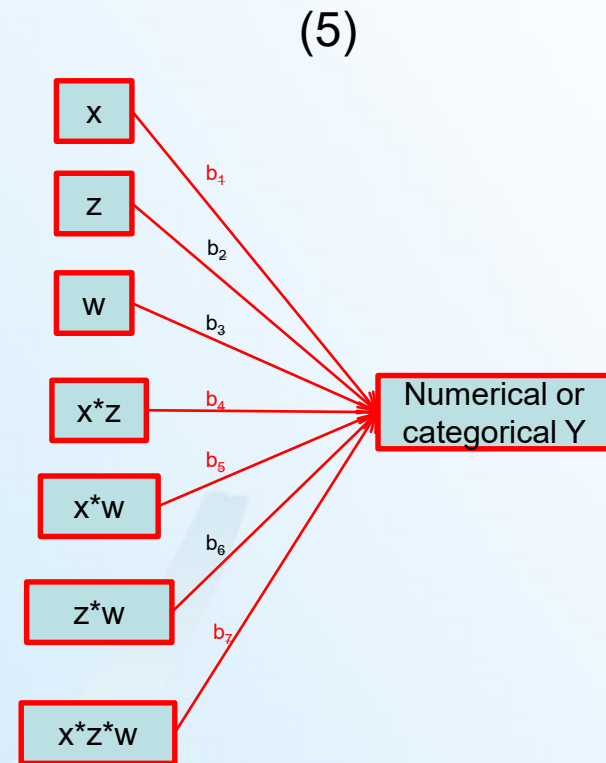
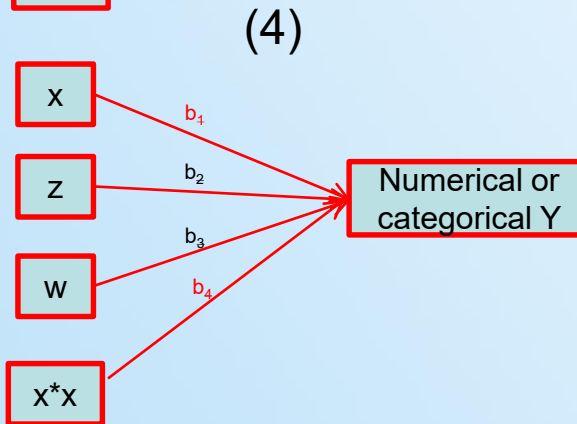
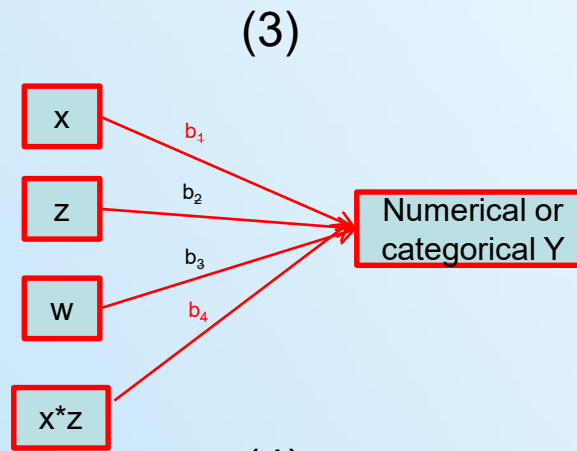
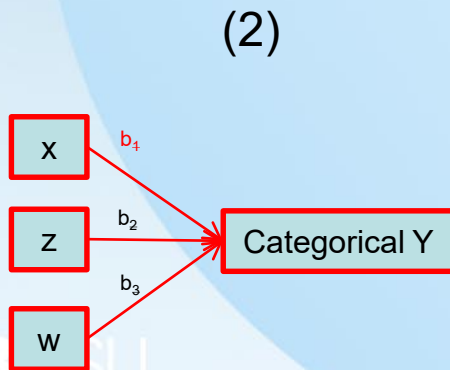
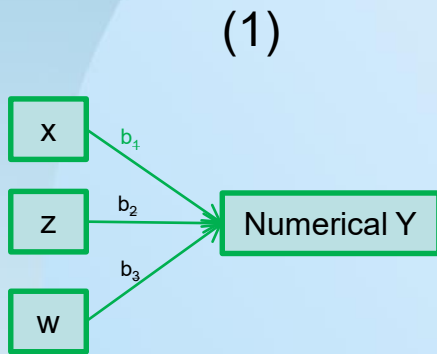
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Overview

- What is the marginal effect of a variable?
- What is the Stata -margins- command?
- Steps of using the -margins- command
- Factor variables in the analysis command
- Syntax of the -margins- command
- Stata examples
- Conclusions

What Is the Marginal Effect of a Variable?

Five scenarios demonstrating what the marginal effect is and why it is needed



What Is the Marginal Effect of a Variable? (Cont.)

Marginal effect shows the effect of X on Y

- In Scenario 1, b_1 shows the average change in y for a one-unit change in X, while holding all other variables constant.
- In Scenario 2, b_1 needs to be transformed into predicted probability to show the average change in y for a one-unit change in X.
- In Scenario 3 and 4, b_1 and b_4 need to be used together in order to know the average change in y for a one-unit change in X.
- In Scenario 3 and 4, b_1 , b_4 , b_5 , and b_7 need to be used together in order to know the average change in y for a one-unit change in X.

When the marginal effect is estimated, what do we do with variables other than X and Y?

- Average marginal effect: Allowing these variables to vary across respondents, meaning that these variables have different impact for different respondents, depending on what values they have on these variables.
- Conditional marginal effect: Setting these variables to a certain value for all respondents, meaning that these variables have same effect on Y for all respondents.

What Is the Stata -margins- Command?

- The -margins- command is a post-estimation technique that generates predicted margins and estimates marginal effects, using estimated coefficients and estimated variance of the residual from the previously estimated model
- The -margin- command is especially useful with the analysis involved categorical dependent variable, the squared term of a predictor, or the interaction of predictors
- The -margins- command works after most Stata estimation command except those that use the alternative-specific estimation commands (e.g., generalized method of moments estimation), that organize data differently (e.g., alternative-specific conditional logit, nested logit regression), or that do not produce full variance matrices (e.g., exact logistic regression or exact poisson regression)
- The -margins- command can be applied to the data that are collected with the complex survey design or from multiple imputation

Steps of Using the -margins- Command

- Analysis part:
 - Decide the research question that dictates the predictor(s), the outcome, and control variables
 - Specify and estimate the analysis model
- -margins- part:
 - Consider how each control variable should be adjusted, whether the predicted margins or marginal effects will be estimated, and whether plotting the margins is needed
 - Specify the -margins- command that uses information from the analysis part to generate, test, or plot the predicted margins of the responses

Factor Variables in the Analysis Command

- Why is it necessary to use factor variables in the analysis command?
 - It provides the information on the attribute of a predictor and allows the `-margins-` command treats categorical predictors and continuous predictors differently.
 - It allows Stata to recognize whether a predictor is a function of other variables. For example, an interaction term is the product of two variables.
- How to specify factor variables?
 - `i` for indicator variables, binary variables, dummies
 - `c` for continuous variables
 - `#` for the squared term of a predictor or the interaction term between two predictors.
 - `##` for both main effects and interaction of the predictors in the analysis model

Syntax of the -margins- Command

Table 1. Basic Syntax of the -Margins- Command

Command	The predictor of interest	predicted margins or the marginal effect	Adjustment of other variables
margins	[marginlist]	, [blank]	[blank]
			atmeans
			at(atspec)
		, dydx(varlist)	[blank]
			atmean
			at(atspec)

Note:

1. These six combinations correspond to what researchers called (1) Average Adjusted Predictions, (2) Adjusted predictions at the Means; (3) Adjusted Predictions at Representative values; (4) Average Marginal Effects; (5) Marginal Effects at the Means; (6) Marginal Effects at Representative values.
2. Only factor variables and their interactions are allowed in the marginlist.
3. The pound sign "#" in the marginlist means the combinations of two predictors even when the analysis does not have the interaction term of these two variables in the data.

Stata Examples

- The Stata command file has six sets of commands
- Five of them show how the `-margins-` command is used for a continuous dependent variable, a binary dependent variable, a nominal dependent variable, when data are collected with a complex survey design, and imputed data
- One shows how to plot the results from the `-margins-` command

Conclusions

- The `-margins-` command is a post-estimation method and needs to be used right after an analysis is conducted. Therefore, the accuracy of the analysis model determines the accuracy of the results from the `-margins-` command.
- The `-margins-` command helps better interpret the analysis results, especially when the analysis involves interaction terms among variables, squared terms of predictors, and non-linear regression models.
- When conducting the analysis, researchers need to indicate predictors and their interactions using the notation of factor variables; otherwise, the `-margins-` command will produce an error message.
- The `-margins-` command estimates the margins of responses for factor variables, so if you have continuous predictors, you need to categorize them or use them as control variables.
- Always check the margins output and see if the `-margins-` command is specified correctly.