

List 11: Marginal effects

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1 Marginal effects

1.1 for probit

Consider a probit-regression $P(y = 1) = \Phi(x' \beta)$, where $x' \beta = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$

Marginal effects $\frac{\partial P(y=1)}{\partial x_j} = \phi(x' \beta) \beta_j$, where $\phi(z) = \frac{1}{\sqrt{2\pi}} \exp\{-z^2/2\}$

1.2 for logit

Consider a logit-regression $P(y = 1) = \Lambda(x' \beta)$, where $x' \beta = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$

Marginal effects $\frac{\partial P(y=1)}{\partial x_j} = \lambda(x' \beta) \beta_j$, where $\lambda(z) = \frac{\exp(z)}{(1+\exp(z))^2}$

1.3 Average marginal effects

Usually we consider

- marginal effects at the mean of each regressor :
 - $\phi(\bar{x}' \beta) \beta_j$ for probit
 - $\lambda(\bar{x}' \beta) \beta_j$ for logit
- The average of the marginal effects at each observation:
 - $\overline{\phi(x' \beta) \beta_j}$ for probit
 - $\overline{\lambda(x' \beta) \beta_j}$ for logit

2 labour force equation

For the dataset TableF5-1 consider regression **LFP на WA, log(FAMINC), WE, KL6, K618, CIT, UN** of the following specifications:

- logit

- probit

The marginal effects at the mean of each regressor for logit model **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	-0.454	0.411	-1.105	0.270
WA	-0.015	0.003	-5.006	0.000
log (FAMINC)	0.083	0.042	1.982	0.048
WE	0.044	0.010	4.450	0.000
KL6	-0.353	0.048	-7.395	0.000
K618	-0.023	0.016	-1.416	0.157
CIT	-0.052	0.043	-1.219	0.223
UN	-0.004	0.006	-0.675	0.500

The marginal effects at the mean of each regressor for probit model. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	-0.434	0.399	-1.089	0.277
WA	-0.015	0.003	-5.066	0.000
log (FAMINC)	0.081	0.041	1.966	0.050
WE	0.042	0.009	4.504	0.000
KL6	-0.340	0.044	-7.663	0.000
K618	-0.022	0.016	-1.402	0.161
CIT	-0.049	0.042	-1.179	0.239
UN	-0.004	0.006	-0.669	0.504

The average of the marginal effects at each observation for logit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	-0.395	0.358	-1.105	0.270
WA	-0.013	0.003	-5.006	0.000
log (FAMINC)	0.073	0.037	1.982	0.048
WE	0.038	0.009	4.450	0.000
KL6	-0.307	0.042	-7.395	0.000
K618	-0.020	0.014	-1.416	0.157
CIT	-0.052	0.043	-1.219	0.223
UN	-0.004	0.005	-0.675	0.500

The average of the marginal effects at each observation for probit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	-0.388	0.357	-1.089	0.277
WA	-0.013	0.003	-5.066	0.000
log (FAMINC)	0.072	0.037	1.966	0.050
WE	0.038	0.008	4.504	0.000
KL6	-0.304	0.040	-7.663	0.000
K618	-0.020	0.014	-1.402	0.161
CIT	-0.049	0.042	-1.179	0.239
UN	-0.004	0.006	-0.669	0.504

3 approve equation

For the dataset loanapp consider regression **approve на appinc/100, mortno, unem, dep, male** of the following specifications:

- logit
- probit

The marginal effects at the mean of each regressor for logit model **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	0.210	0.019	10.915	0.000
I(appinc/100)	-0.011	0.007	-1.583	0.114
mortno	0.077	0.014	5.451	0.000
unem	-0.007	0.003	-2.260	0.024
dep	-0.011	0.006	-1.741	0.082
male	0.019	0.020	0.945	0.345

The marginal effects at the mean of each regressor for probit model. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	0.237	0.020	12.009	0.000
I(appinc/100)	-0.011	0.008	-1.468	0.142
mortno	0.077	0.014	5.415	0.000
unem	-0.007	0.003	-2.272	0.023
dep	-0.011	0.007	-1.650	0.099
male	0.019	0.020	0.953	0.341

The average of the marginal effects at each observation for logit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	0.217	0.020	10.915	0.000
I(appinc/100)	-0.011	0.007	-1.583	0.114
mortno	0.077	0.014	5.451	0.000
unem	-0.007	0.003	-2.260	0.024
dep	-0.011	0.006	-1.741	0.082
male	0.019	0.020	0.945	0.345

The average of the marginal effects at each observation for probit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	0.239	0.020	12.009	0.000
I(appinc/100)	-0.011	0.008	-1.468	0.142
mortno	0.077	0.014	5.415	0.000
unem	-0.007	0.003	-2.272	0.023
dep	-0.011	0.007	-1.650	0.099
male	0.019	0.020	0.953	0.341

4 swiss labour force equation

For the dataset `SwissLabour` consider regression **participation** на income, age, age², youngkids, oldkids of the following specification:

- logit
- probit

The marginal effects at the mean of each regressor for logit model **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	2.083	0.576	3.617	0.000
income	-0.330	0.053	-6.249	0.000
age	0.965	0.165	5.849	0.000
I(age^2)	-0.136	0.020	-6.633	0.000
youngkids	-0.264	0.041	-6.458	0.000
oldkids	-0.062	0.020	-3.052	0.002

The marginal effects at the mean of each regressor for probit model. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	2.000	0.547	3.657	0.000
income	-0.318	0.050	-6.419	0.000
age	0.934	0.157	5.961	0.000
I (age^2)	-0.131	0.019	-6.794	0.000
youngkids	-0.253	0.039	-6.567	0.000
oldkids	-0.060	0.020	-3.048	0.002

The average of the marginal effects at each observation for logit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	1.762	0.487	3.617	0.000
income	-0.279	0.045	-6.249	0.000
age	0.817	0.140	5.849	0.000
I (age^2)	-0.115	0.017	-6.633	0.000
youngkids	-0.224	0.035	-6.458	0.000
oldkids	-0.053	0.017	-3.052	0.002

The average of the marginal effects at each observation for probit модели. **Round the answer to 3 decimal places.**

	effect	error	t.value	p.value
(Intercept)	1.745	0.477	3.657	0.000
income	-0.278	0.043	-6.419	0.000
age	0.815	0.137	5.961	0.000
I (age^2)	-0.115	0.017	-6.794	0.000
youngkids	-0.221	0.034	-6.567	0.000
oldkids	-0.053	0.017	-3.048	0.002