

G1046413 00

Nuntayod

a)

```
. ml model lf ml_logit (y = x1 x2 x3 x4)
. ml maximize

initial:      log likelihood = -90.109133
Iteration 7:   log likelihood = -54.627603

                                Number of obs   =       130
                                Wald chi2(4)      =       22.79
Log likelihood = -54.627603      Prob > chi2   =       0.0001
```

y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
x1	.4835128	.1686119	2.87	0.004	.1530395	.813986
x2	1.454009	.5001373	2.91	0.004	.4737577	2.43426
x3	2.173186	.7757021	2.80	0.005	.652838	3.693535
x4	1.855464	.7138855	2.60	0.009	.4562738	3.254653
_cons	-1.400447	.5531237	-2.53	0.011	-2.484549	-.316344

b)

```
. test (x1=0) (x2=0) (x3=0) (x4=0)
```

```
( 1) [eq1]x1 = 0
( 2) [eq1]x2 = 0
( 3) [eq1]x3 = 0
( 4) [eq1]x4 = 0
```

```
      chi2( 4) =    22.79
    Prob > chi2 =    0.0001
```

```
. est store unres
```

```
. ml model lf ml_logit (y=)
```

```
. ml maximize
```

```
initial:      log likelihood = -90.109133
alternative:   log likelihood = -86.130008
rescale:      log likelihood = -86.130008
Iteration 0:   log likelihood = -86.130008
Iteration 1:   log likelihood = -86.129902
Iteration 2:   log likelihood = -86.129902
```

```
                                Number of obs   =       130
                                Wald chi2(0)      =           .
Log likelihood = -86.129902      Prob > chi2   =           .
```

y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_cons	.5026289	.1809802	2.78	0.005	.1479141	.8573436

```
. est store res
```

```
. lrtest unres res
```

```
Likelihood-ratio test                                LR chi2(4) =    63.00
(Assumption: res nested in unres)                   Prob > chi2 =    0.0000
```

} Wald test

} LR-test

c)

```
. ml model lf ml_logit (y = x1 x2 x3 x4), tech(bhhh)
. ml maximize

Initial:      log likelihood = -90.109133
Alternative:  log likelihood = -86.130008
Rescale:      log likelihood = -86.130008
Iteration 0:  log likelihood = -86.130008
Iteration 1:  log likelihood = -64.805009
Iteration 25: log likelihood = -54.627605

                                Number of obs   =    130
                                Wald chi2(4)      =    16.34
                                Prob > chi2       =    0.0026

Log likelihood = -54.627605
```

	y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
x1		.4833318	.1542635	3.13	0.002	.180981 .7856827
x2		1.453275	.597925	2.43	0.015	.2813639 2.625187
x3		2.172641	.8589781	2.53	0.011	.489075 3.856207
x4		1.854961	.7142729	2.60	0.009	.4550117 3.25491
_cons		-1.400063	.5625155	-2.49	0.013	-2.502573 -.2975527

d)

```
. ml model lf ml_probit (y = x1 x2), tech(nr)
. ml maximize

Initial:      log likelihood = -90.109133
Alternative:  log likelihood = -87.504336
Rescale:      log likelihood = -86.291737
Iteration 0:  log likelihood = -86.291737
Iteration 1:  log likelihood = -70.553778
Iteration 2:  log likelihood = -65.28309
Iteration 3:  log likelihood = -60.753707
Iteration 4:  log likelihood = -60.695531
Iteration 5:  log likelihood = -60.695503
Iteration 6:  log likelihood = -60.695503

                                Number of obs   =    130
                                Wald chi2(2)      =    22.61
                                Prob > chi2       =    0.0000

Log likelihood = -60.695503
```

	y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
x1		.3592444	.0871351	4.12	0.000	.1884627 .5300262
x2		1.139607	.3224845	3.53	0.000	.5075491 1.771665
_cons		-.7729211	.2765064	-2.80	0.005	-1.314864 -.2309785

e)

```
. ml model lf ml_probit_het (y = x1 x2) (x4, noconstant)
. ml maximize

Initial:      log likelihood = -90.109133
Alternative:  log likelihood = -83.932039
Rescale:      log likelihood = -83.932039
Rescale eq:   log likelihood = -70.42663
Iteration 0:  log likelihood = -70.42663
Iteration 1:  log likelihood = -69.416382
Iteration 11: log likelihood = -59.404451

                                Number of obs   =    130
                                Wald chi2(2)      =    16.42
                                Prob > chi2       =    0.0003

Log likelihood = -59.404451
```

	y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
eq1	x1	.2921402	.0773775	3.78	0.000	.140483 .4437974
	x2	.9417315	.2800569	3.36	0.001	.3928299 1.490633
	_cons	-.6388427	.2144265	-2.98	0.003	-1.059111 -.2185744
eq2	x4	1.18393	.585199	2.02	0.043	.0369609 2.330899

```
. est store hetres
. lrtest unres hetres

Likelihood-ratio test      LR chi2(1) =    9.55
(Assumption: hetres nested in unres)  Prob > chi2 =    0.0020
```

The different of the algorithm effect the value of estimator to be change accordingly also $\log(L)$, std., z-value, overall-test value (χ^2), etc., even the change was very small.

H_0 : heteroskedasticity

H_0 : Otherwise

$$\text{Prob} > \chi^2 = 0.002 < 0.05 = \alpha$$

$\therefore H_0$ is rejected at 5% level.

Heteroskedasticity doesn't exist.

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