. // Model PS.Y.B.SP.SSV.1

**. eststo: logit dv\_indicator `ss\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) offset(lnhours) iter(50) or**

note: sp48\_4\_ss != 0 predicts success perfectly

sp48\_4\_ss dropped and 2 obs not used

note: sp75\_1003\_ss != 0 predicts success perfectly

sp75\_1003\_ss dropped and 94 obs not used

note: sp75\_1003\_2\_ss != 0 predicts success perfectly

sp75\_1003\_2\_ss dropped and 2 obs not used

note: sp75\_1318\_ss != 0 predicts success perfectly

sp75\_1318\_ss dropped and 1 obs not used

note: sp75\_1400\_1\_ss != 0 predicts success perfectly

sp75\_1400\_1\_ss dropped and 5 obs not used

note: sp75\_1404\_ss != 0 predicts success perfectly

sp75\_1404\_ss dropped and 3 obs not used

note: sp75\_1405\_1\_ss != 0 predicts success perfectly

sp75\_1405\_1\_ss dropped and 1 obs not used

note: sp75\_153\_ss != 0 predicts success perfectly

sp75\_153\_ss dropped and 1 obs not used

note: sp75\_155\_ss != 0 predicts success perfectly

sp75\_155\_ss dropped and 1 obs not used

note: sp75\_156\_ss != 0 predicts success perfectly

sp75\_156\_ss dropped and 1 obs not used

note: sp75\_1719\_4\_ss != 0 predicts success perfectly

sp75\_1719\_4\_ss dropped and 14 obs not used

note: sp75\_1906\_ss != 0 predicts success perfectly

sp75\_1906\_ss dropped and 5 obs not used

note: sp75\_1916\_ss != 0 predicts success perfectly

sp75\_1916\_ss dropped and 47 obs not used

note: sp75\_205\_ss != 0 predicts success perfectly

sp75\_205\_ss dropped and 12 obs not used

note: sp75\_213\_ss != 0 predicts success perfectly

sp75\_213\_ss dropped and 4 obs not used

note: sp75\_215\_ss != 0 predicts success perfectly

sp75\_215\_ss dropped and 3 obs not used

note: sp75\_343\_ss != 0 predicts success perfectly

sp75\_343\_ss dropped and 8 obs not used

note: sp75\_505\_ss != 0 predicts success perfectly

sp75\_505\_ss dropped and 8 obs not used

note: sp75\_506\_1\_ss != 0 predicts success perfectly

sp75\_506\_1\_ss dropped and 8 obs not used

note: sp75\_524\_ss != 0 predicts success perfectly

sp75\_524\_ss dropped and 7 obs not used

note: sp75\_812\_ss != 0 predicts success perfectly

sp75\_812\_ss dropped and 11 obs not used

note: sp75\_817\_ss != 0 predicts success perfectly

sp75\_817\_ss dropped and 3 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 10 obs not used

note: sp75\_1322\_ss omitted because of collinearity

note: sp75\_373\_ss omitted because of collinearity

note: sp75\_500\_1\_ss omitted because of collinearity

Iteration 0: log pseudolikelihood = -1953.7569

Iteration 1: log pseudolikelihood = -1733.948

Iteration 2: log pseudolikelihood = -1706.9121

Iteration 3: log pseudolikelihood = -1704.0852

Iteration 4: log pseudolikelihood = -1703.7124

Iteration 5: log pseudolikelihood = -1703.7061

Iteration 6: log pseudolikelihood = -1703.7061

Iteration 7: log pseudolikelihood = -1703.7061

Iteration 8: log pseudolikelihood = -1703.7061

Iteration 9: log pseudolikelihood = -1703.7061

Iteration 10: log pseudolikelihood = -1703.7061 (backed up)

Iteration 11: log pseudolikelihood = -1703.7061 (backed up)

Iteration 12: log pseudolikelihood = -1703.7061 (backed up)

Iteration 13: log pseudolikelihood = -1703.7061 (backed up)

Iteration 14: log pseudolikelihood = -1703.7061 (backed up)

Iteration 15: log pseudolikelihood = -1703.7061 (backed up)

Iteration 16: log pseudolikelihood = -1703.7061 (backed up)

Iteration 17: log pseudolikelihood = -1703.7061 (backed up)

Iteration 18: log pseudolikelihood = -1703.7061 (backed up)

Iteration 19: log pseudolikelihood = -1703.7061 (backed up)

Iteration 20: log pseudolikelihood = -1703.7061 (backed up)

Iteration 21: log pseudolikelihood = -1703.7061 (backed up)

Iteration 22: log pseudolikelihood = -1703.7061 (backed up)

Iteration 23: log pseudolikelihood = -1703.7061 (backed up)

Iteration 24: log pseudolikelihood = -1703.7061 (backed up)

Iteration 25: log pseudolikelihood = -1703.7061 (backed up)

Iteration 26: log pseudolikelihood = -1703.7061 (backed up)

Iteration 27: log pseudolikelihood = -1703.7061 (backed up)

Iteration 28: log pseudolikelihood = -1703.7061 (backed up)

Iteration 29: log pseudolikelihood = -1703.7061 (backed up)

Iteration 30: log pseudolikelihood = -1703.7061 (backed up)

Iteration 31: log pseudolikelihood = -1703.7061 (backed up)

Iteration 32: log pseudolikelihood = -1703.7061 (backed up)

Iteration 33: log pseudolikelihood = -1703.7061 (backed up)

Iteration 34: log pseudolikelihood = -1703.7061 (backed up)

Iteration 35: log pseudolikelihood = -1703.7061 (backed up)

Iteration 36: log pseudolikelihood = -1703.7061 (backed up)

Iteration 37: log pseudolikelihood = -1703.7061 (backed up)

Iteration 38: log pseudolikelihood = -1703.7061 (backed up)

Iteration 39: log pseudolikelihood = -1703.7061 (backed up)

Iteration 40: log pseudolikelihood = -1703.7061 (backed up)

Iteration 41: log pseudolikelihood = -1703.7061 (backed up)

Iteration 42: log pseudolikelihood = -1703.7061 (backed up)

Iteration 43: log pseudolikelihood = -1703.7061 (backed up)

Iteration 44: log pseudolikelihood = -1703.7061 (backed up)

Iteration 45: log pseudolikelihood = -1703.7061 (backed up)

Iteration 46: log pseudolikelihood = -1703.7061 (backed up)

Iteration 47: log pseudolikelihood = -1703.7061 (backed up)

Iteration 48: log pseudolikelihood = -1703.7061 (backed up)

Iteration 49: log pseudolikelihood = -1703.7061 (backed up)

Iteration 50: log pseudolikelihood = -1703.7061 (backed up)

convergence not achieved

Logistic regression Number of obs = 6,002

Wald chi2(89) = .

Log pseudolikelihood = -1703.7061 Prob > chi2 = .

(Std. Err. adjusted for 1,233 clusters in mineid)

-----------------------------------------------------------------------------------

| Robust

dv\_indicator | Odds Ratio Std. Err. z P>|z| [95% Conf. Interval]

------------------+----------------------------------------------------------------

sp48\_11\_ss | 1.242551 .559958 0.48 0.630 .5137111 3.005452

sp48\_25\_ss | 1.249094 .7557608 0.37 0.713 .3815733 4.088954

sp48\_26\_ss | 1.321041 .470962 0.78 0.435 .6568346 2.656909

sp48\_27\_ss | .5562985 .3581801 -0.91 0.362 .1574891 1.965012

sp48\_28\_ss | 3.88425 3.383791 1.56 0.119 .7043316 21.42087

sp48\_4\_ss | 1 (omitted)

sp48\_5\_ss | 1.182144 .6695688 0.30 0.768 .3895367 3.587506

sp48\_6\_ss | .5260277 .1706631 -1.98 0.048 .2785139 .9935056

sp48\_7\_ss | 2.08276 .9754553 1.57 0.117 .8317279 5.215516

sp48\_8\_ss | 1.143621 .5817692 0.26 0.792 .4219578 3.099525

sp75\_100\_ss | 1.105365 1.323923 0.08 0.933 .1056818 11.56141

sp75\_1002\_ss | 3.248836 3.165382 1.21 0.227 .4812726 21.9313

sp75\_1003\_ss | 1 (omitted)

sp75\_1003\_2\_ss | 1 (omitted)

sp75\_1311\_ss | .4197972 .3148628 -1.16 0.247 .096518 1.825874

sp75\_1315\_ss | .3924171 .3380303 -1.09 0.278 .0725301 2.123136

sp75\_1316\_ss | .2211051 .1571024 -2.12 0.034 .0549278 .8900312

sp75\_1318\_ss | 1 (omitted)

sp75\_1322\_ss | 1 (omitted)

sp75\_1400\_ss | 3.285631 2.720022 1.44 0.151 .6485576 16.6452

sp75\_1400\_1\_ss | 1 (omitted)

sp75\_1403\_10\_ss | 3.107701 1.996145 1.77 0.078 .8824574 10.94422

sp75\_1403\_5\_ss | .9343841 .2553657 -0.25 0.804 .5468817 1.596458

sp75\_1403\_6\_ss | 1.410847 .4385794 1.11 0.268 .7671379 2.594697

sp75\_1403\_7\_ss | .4005471 .1527891 -2.40 0.016 .189654 .845951

sp75\_1403\_8\_ss | 2.430314 3.547706 0.61 0.543 .1390279 42.48376

sp75\_1404\_ss | 1 (omitted)

sp75\_1404\_1\_ss | .0638475 .0490761 -3.58 0.000 .0141538 .2880154

sp75\_1405\_ss | 2.734871 2.61555 1.05 0.293 .4196362 17.82382

sp75\_1405\_1\_ss | 1 (omitted)

sp75\_153\_ss | 1 (omitted)

sp75\_155\_ss | 1 (omitted)

sp75\_156\_ss | 1 (omitted)

sp75\_1719\_2\_ss | 0 0 -0.01 0.992 0 .

sp75\_1719\_4\_ss | 1 (omitted)

sp75\_1720\_ss | .8837065 .1259616 -0.87 0.386 .6683126 1.168521

sp75\_1725\_ss | 1.030594 .0389291 0.80 0.425 .9570503 1.109789

sp75\_1906\_ss | 1 (omitted)

sp75\_1916\_ss | 1 (omitted)

sp75\_203\_ss | 1.049365 .073437 0.69 0.491 .9148657 1.203637

sp75\_204\_ss | 1.2158 .1939603 1.22 0.221 .8893388 1.662099

sp75\_205\_ss | 1 (omitted)

sp75\_207\_ss | 2.467845 2.184877 1.02 0.308 .4352282 13.99326

sp75\_208\_ss | .8101943 .0682831 -2.50 0.013 .6868311 .955715

sp75\_209\_ss | 1.179563 .2767259 0.70 0.481 .7447814 1.868156

sp75\_212\_ss | 1.552129 1.054351 0.65 0.518 .4099324 5.876834

sp75\_213\_ss | 1 (omitted)

sp75\_215\_ss | 1 (omitted)

sp75\_332\_ss | .210941 .0928624 -3.53 0.000 .0890097 .499902

sp75\_334\_ss | .9081643 .3035017 -0.29 0.773 .4717362 1.748355

sp75\_337\_ss | .6269383 .3371408 -0.87 0.385 .2185167 1.798725

sp75\_340\_ss | 1.503216 .3107606 1.97 0.049 1.002426 2.254191

sp75\_343\_ss | 1 (omitted)

sp75\_373\_ss | 1 (omitted)

sp75\_388\_ss | .9188411 .187023 -0.42 0.678 .6165735 1.369291

sp75\_389\_ss | .3472331 .2109493 -1.74 0.082 .1055609 1.142191

sp75\_500\_ss | 1.074272 .5790306 0.13 0.894 .3735237 3.089657

sp75\_500\_1\_ss | 1 (omitted)

sp75\_501\_ss | .5467786 .5680521 -0.58 0.561 .0713662 4.189197

sp75\_501\_2\_ss | .2667683 .2016982 -1.75 0.081 .0606119 1.174116

sp75\_502\_ss | .5558205 .5195624 -0.63 0.530 .0889733 3.472236

sp75\_503\_ss | 1.088381 .056383 1.63 0.102 .9832971 1.204695

sp75\_505\_ss | 1 (omitted)

sp75\_506\_1\_ss | 1 (omitted)

sp75\_507\_ss | 2.66119 2.130485 1.22 0.221 .5541463 12.7799

sp75\_507\_1\_ss | .5756913 .2043559 -1.56 0.120 .287101 1.154369

sp75\_509\_ss | 2.397298 2.048863 1.02 0.306 .4489914 12.79988

sp75\_512\_1\_ss | .03166 .0344557 -3.17 0.002 .003751 .2672248

sp75\_523\_ss | .8459353 .092244 -1.53 0.125 .6831544 1.047503

sp75\_523\_3\_ss | .8970437 .0488929 -1.99 0.046 .8061564 .9981778

sp75\_524\_ss | 1 (omitted)

sp75\_602\_ss | .7120661 .3782279 -0.64 0.523 .2514131 2.016753

sp75\_603\_ss | .9096698 .4250463 -0.20 0.839 .3640466 2.273058

sp75\_604\_ss | 1.055153 .0490445 1.16 0.248 .9632766 1.155793

sp75\_605\_ss | 1.158146 .2087787 0.81 0.415 .8134249 1.648957

sp75\_606\_ss | .9435459 .0857863 -0.64 0.523 .7895372 1.127596

sp75\_607\_ss | 1.509341 .8010602 0.78 0.438 .5333655 4.2712

sp75\_703\_3\_ss | 2.327911 3.120356 0.63 0.528 .1682702 32.20517

sp75\_807\_ss | .9608116 .1222639 -0.31 0.753 .7487249 1.232975

sp75\_810\_ss | .581526 .2763235 -1.14 0.254 .2291417 1.475823

sp75\_811\_ss | .2789141 .2518881 -1.41 0.157 .0475059 1.637544

sp75\_812\_ss | 1 (omitted)

sp75\_816\_ss | .4906942 .2386618 -1.46 0.143 .1891503 1.27296

sp75\_817\_ss | 1 (omitted)

sp75\_906\_ss | .1753099 .1036956 -2.94 0.003 .0549948 .5588449

mine\_time | 1.014595 .0199639 0.74 0.462 .9762112 1.054487

onsite\_insp\_hours | 1.003735 .0004458 8.39 0.000 1.002862 1.004609

|

state |

1 | .9946393 .7771139 -0.01 0.995 .2150898 4.599507

2 | .6416417 .101362 -2.81 0.005 .4707885 .874499

3 | 1.290967 .5543091 0.59 0.552 .5564551 2.995021

4 | 4.490663 3.483194 1.94 0.053 .9819154 20.53747

5 | .8679387 .4457004 -0.28 0.783 .3172367 2.374623

6 | .4922833 .0719585 -4.85 0.000 .3696515 .6555983

7 | 2.076944 2.304191 0.66 0.510 .2360966 18.27089

8 | .7769115 .1485693 -1.32 0.187 .534067 1.130179

9 | .1936613 .0278295 -11.42 0.000 .1461247 .2566624

10 | .6768152 .2745081 -0.96 0.336 .305656 1.498674

11 | 2.487295 2.11466 1.07 0.284 .469947 13.16454

12 | .5083727 .1103359 -3.12 0.002 .3322306 .7779019

13 | 2.079252 1.356442 1.12 0.262 .5789064 7.468026

14 | .4251305 .1769689 -2.05 0.040 .1880152 .9612838

15 | .6372509 .1109304 -2.59 0.010 .4530397 .8963645

17 | 1 (empty)

|

time |

2000 | 1.043286 .19929 0.22 0.824 .7174727 1.517054

2002 | .6879679 .1355771 -1.90 0.058 .4675443 1.01231

2003 | .9344326 .2145336 -0.30 0.768 .5958312 1.465456

2004 | .5249173 .1147 -2.95 0.003 .3420537 .8055406

2005 | .4892847 .1031107 -3.39 0.001 .3237289 .7395063

2006 | .484363 .1059511 -3.31 0.001 .3154833 .7436445

2007 | .3126641 .0698068 -5.21 0.000 .2018529 .4843075

2008 | .2312482 .0522658 -6.48 0.000 .1484887 .3601335

2009 | .2738491 .0692257 -5.12 0.000 .1668546 .4494533

2010 | .2005171 .0510286 -6.31 0.000 .1217681 .3301942

2011 | .2497818 .0654127 -5.30 0.000 .1495025 .4173237

2012 | .172974 .0438565 -6.92 0.000 .1052359 .2843137

2013 | .2448854 .0728251 -4.73 0.000 .136719 .4386288

2014 | .1521818 .0449192 -6.38 0.000 .0853327 .2714001

2015 | .107273 .0342491 -6.99 0.000 .0573755 .2005646

|

\_cons | .0001307 .000024 -48.78 0.000 .0000912 .0001872

lnhours | 1 (offset)

-----------------------------------------------------------------------------------

Note: 1 failure and 54 successes completely determined.

Warning: convergence not achieved

(est1 stored)

**. lfit**

Logistic model for dv\_indicator, goodness-of-fit test

number of observations = 6002

number of covariate patterns = 5987

Pearson chi2(5894) = 8614.51

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -2781.1917

Iteration 1: log likelihood = -2057.4491

Iteration 2: log likelihood = -1711.6197

Iteration 3: log likelihood = -1689.2348

Iteration 4: log likelihood = -1689.1203

Iteration 5: log likelihood = -1689.1202

Logistic regression Number of obs = 6,002

LR chi2(1) = 2184.14

Prob > chi2 = 0.0000

Log likelihood = -1689.1202 Pseudo R2 = 0.3927

------------------------------------------------------------------------------

dv\_indicator | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

\_hat | 1.074909 .0353965 30.37 0.000 1.005533 1.144285

\_hatsq | 1.61e-06 5.29e-08 30.37 0.000 1.50e-06 1.71e-06

\_cons | -.0717458 .0549798 -1.30 0.192 -.1795042 .0360126

------------------------------------------------------------------------------

Note: 0 failures and 67 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

-------- True --------

Classified | D ~D | Total

-----------+--------------------------+-----------

+ | 4779 593 | 5372

- | 174 456 | 630

-----------+--------------------------+-----------

Total | 4953 1049 | 6002

Classified + if predicted Pr(D) >= .5

--------------------------------------------------

Sensitivity Pr( +| D) 96.49%

Specificity Pr( -|~D) 43.47%

Positive predictive value Pr( D| +) 88.96%

Negative predictive value Pr(~D| -) 72.38%

--------------------------------------------------

False + rate for true ~D Pr( +|~D) 56.53%

False - rate for true D Pr( -| D) 3.51%

False + rate for classified + Pr(~D| +) 11.04%

False - rate for classified - Pr( D| -) 27.62%

--------------------------------------------------

Correctly classified 87.22%

--------------------------------------------------

**. summ dv\_indicator bssv1\_yhat**

Variable | Obs Mean Std. Dev. Min Max

-------------+---------------------------------------------------------

dv\_indicator | 6,253 .8322405 .3736824 0 1

bssv1\_yhat | 6,002 .8250583 .2306034 0 1