. // Model PS.Y.B.SP.SSV.2

**. eststo: logit dv\_indicator `ss\_lag\_1\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) offset(lnhours) iter(50) or**

note: sp48\_4\_ss\_1lag != 0 predicts success perfectly

sp48\_4\_ss\_1lag dropped and 1 obs not used

note: sp75\_1003\_ss\_1lag != 0 predicts success perfectly

sp75\_1003\_ss\_1lag dropped and 93 obs not used

note: sp75\_1003\_2\_ss\_1lag != 0 predicts success perfectly

sp75\_1003\_2\_ss\_1lag dropped and 3 obs not used

note: sp75\_1400\_1\_ss\_1lag != 0 predicts success perfectly

sp75\_1400\_1\_ss\_1lag dropped and 5 obs not used

note: sp75\_1404\_ss\_1lag != 0 predicts success perfectly

sp75\_1404\_ss\_1lag dropped and 2 obs not used

note: sp75\_1405\_ss\_1lag != 0 predicts success perfectly

sp75\_1405\_ss\_1lag dropped and 183 obs not used

note: sp75\_1405\_1\_ss\_1lag != 0 predicts success perfectly

sp75\_1405\_1\_ss\_1lag dropped and 2 obs not used

note: sp75\_153\_ss\_1lag != 0 predicts success perfectly

sp75\_153\_ss\_1lag dropped and 1 obs not used

note: sp75\_156\_ss\_1lag != 0 predicts success perfectly

sp75\_156\_ss\_1lag dropped and 1 obs not used

note: sp75\_1719\_4\_ss\_1lag != 0 predicts success perfectly

sp75\_1719\_4\_ss\_1lag dropped and 11 obs not used

note: sp75\_1906\_ss\_1lag != 0 predicts success perfectly

sp75\_1906\_ss\_1lag dropped and 3 obs not used

note: sp75\_1916\_ss\_1lag != 0 predicts success perfectly

sp75\_1916\_ss\_1lag dropped and 41 obs not used

note: sp75\_205\_ss\_1lag != 0 predicts success perfectly

sp75\_205\_ss\_1lag dropped and 10 obs not used

note: sp75\_207\_ss\_1lag != 0 predicts success perfectly

sp75\_207\_ss\_1lag dropped and 22 obs not used

note: sp75\_213\_ss\_1lag != 0 predicts success perfectly

sp75\_213\_ss\_1lag dropped and 4 obs not used

note: sp75\_215\_ss\_1lag != 0 predicts success perfectly

sp75\_215\_ss\_1lag dropped and 1 obs not used

note: sp75\_343\_ss\_1lag != 0 predicts success perfectly

sp75\_343\_ss\_1lag dropped and 5 obs not used

note: sp75\_505\_ss\_1lag != 0 predicts success perfectly

sp75\_505\_ss\_1lag dropped and 7 obs not used

note: sp75\_506\_1\_ss\_1lag != 0 predicts success perfectly

sp75\_506\_1\_ss\_1lag dropped and 7 obs not used

note: sp75\_524\_ss\_1lag != 0 predicts success perfectly

sp75\_524\_ss\_1lag dropped and 7 obs not used

note: sp75\_703\_3\_ss\_1lag != 0 predicts success perfectly

sp75\_703\_3\_ss\_1lag dropped and 26 obs not used

note: sp75\_812\_ss\_1lag != 0 predicts success perfectly

sp75\_812\_ss\_1lag dropped and 7 obs not used

note: sp75\_817\_ss\_1lag != 0 predicts success perfectly

sp75\_817\_ss\_1lag dropped and 3 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 10 obs not used

note: sp75\_1318\_ss\_1lag omitted because of collinearity

note: sp75\_1322\_ss\_1lag omitted because of collinearity

note: sp75\_155\_ss\_1lag omitted because of collinearity

note: sp75\_373\_ss\_1lag omitted because of collinearity

note: sp75\_500\_1\_ss\_1lag omitted because of collinearity

Iteration 0: log pseudolikelihood = -1934.1585

Iteration 1: log pseudolikelihood = -1722.6234

Iteration 2: log pseudolikelihood = -1699.7228

Iteration 3: log pseudolikelihood = -1697.1412

Iteration 4: log pseudolikelihood = -1697.028

Iteration 5: log pseudolikelihood = -1697.0276

Iteration 6: log pseudolikelihood = -1697.0276

Iteration 7: log pseudolikelihood = -1697.0276

Iteration 8: log pseudolikelihood = -1697.0276

Iteration 9: log pseudolikelihood = -1697.0276 (backed up)

Iteration 10: log pseudolikelihood = -1697.0276 (backed up)

Iteration 11: log pseudolikelihood = -1697.0276 (backed up)

Iteration 12: log pseudolikelihood = -1697.0276 (backed up)

Iteration 13: log pseudolikelihood = -1697.0276 (backed up)

Iteration 14: log pseudolikelihood = -1697.0276 (backed up)

Iteration 15: log pseudolikelihood = -1697.0276 (backed up)

Iteration 16: log pseudolikelihood = -1697.0276 (backed up)

Iteration 17: log pseudolikelihood = -1697.0276 (backed up)

Iteration 18: log pseudolikelihood = -1697.0276 (backed up)

Iteration 19: log pseudolikelihood = -1697.0276 (backed up)

Iteration 20: log pseudolikelihood = -1697.0276 (backed up)

Iteration 21: log pseudolikelihood = -1697.0276 (backed up)

Iteration 22: log pseudolikelihood = -1697.0276 (backed up)

Iteration 23: log pseudolikelihood = -1697.0276 (backed up)

Iteration 24: log pseudolikelihood = -1697.0276 (backed up)

Iteration 25: log pseudolikelihood = -1697.0276 (backed up)

Iteration 26: log pseudolikelihood = -1697.0276 (backed up)

Iteration 27: log pseudolikelihood = -1697.0276 (backed up)

Iteration 28: log pseudolikelihood = -1697.0276 (backed up)

Iteration 29: log pseudolikelihood = -1697.0276 (backed up)

Iteration 30: log pseudolikelihood = -1697.0276 (backed up)

Iteration 31: log pseudolikelihood = -1697.0276 (backed up)

Iteration 32: log pseudolikelihood = -1697.0276 (backed up)

Iteration 33: log pseudolikelihood = -1697.0276 (backed up)

Iteration 34: log pseudolikelihood = -1697.0276 (backed up)

Iteration 35: log pseudolikelihood = -1697.0276 (backed up)

Iteration 36: log pseudolikelihood = -1697.0276 (backed up)

Iteration 37: log pseudolikelihood = -1697.0276 (backed up)

Iteration 38: log pseudolikelihood = -1697.0276 (backed up)

Iteration 39: log pseudolikelihood = -1697.0276 (backed up)

Iteration 40: log pseudolikelihood = -1697.0276 (backed up)

Iteration 41: log pseudolikelihood = -1697.0276 (backed up)

Iteration 42: log pseudolikelihood = -1697.0276 (backed up)

Iteration 43: log pseudolikelihood = -1697.0276 (backed up)

Iteration 44: log pseudolikelihood = -1697.0276 (backed up)

Iteration 45: log pseudolikelihood = -1697.0276 (backed up)

Iteration 46: log pseudolikelihood = -1697.0276 (backed up)

Iteration 47: log pseudolikelihood = -1697.0276 (backed up)

Iteration 48: log pseudolikelihood = -1697.0276 (backed up)

Iteration 49: log pseudolikelihood = -1697.0276 (backed up)

Iteration 50: log pseudolikelihood = -1697.0276 (backed up)

convergence not achieved

Logistic regression Number of obs = 5,798

Wald chi2(86) = .

Log pseudolikelihood = -1697.0276 Prob > chi2 = .

(Std. Err. adjusted for 1,227 clusters in mineid)

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

| Robust

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

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

sp48\_11\_ss\_1lag | 1.197308 .5396256 0.40 0.689 .4949603 2.896288

sp48\_25\_ss\_1lag | 1.959073 1.855409 0.71 0.478 .3061191 12.5375

sp48\_26\_ss\_1lag | 1.317711 .4084129 0.89 0.373 .7177902 2.419037

sp48\_27\_ss\_1lag | .7876088 .6088867 -0.31 0.757 .1730858 3.583932

sp48\_28\_ss\_1lag | 3.096463 2.745096 1.27 0.202 .5448205 17.59861

sp48\_4\_ss\_1lag | 1 (omitted)

sp48\_5\_ss\_1lag | 4.044946 4.247607 1.33 0.183 .5164926 31.67827

sp48\_6\_ss\_1lag | .5863297 .2221463 -1.41 0.159 .2790242 1.232088

sp48\_7\_ss\_1lag | 1.007819 .4208563 0.02 0.985 .4445581 2.28474

sp48\_8\_ss\_1lag | .9936592 .5552242 -0.01 0.991 .332364 2.970715

sp75\_100\_ss\_1lag | 1.355934 1.623229 0.25 0.799 .1297894 14.16569

sp75\_1002\_ss\_1lag | 2.921825 2.857018 1.10 0.273 .4298656 19.85984

sp75\_1003\_ss\_1lag | 1 (omitted)

sp75\_1003\_2\_ss\_1lag | 1 (omitted)

sp75\_1311\_ss\_1lag | .341188 .2684868 -1.37 0.172 .0729741 1.595214

sp75\_1315\_ss\_1lag | .425581 .3975892 -0.91 0.360 .0681973 2.655813

sp75\_1316\_ss\_1lag | .3764762 .2300552 -1.60 0.110 .1136553 1.247055

sp75\_1318\_ss\_1lag | 1 (omitted)

sp75\_1322\_ss\_1lag | 1 (omitted)

sp75\_1400\_ss\_1lag | 1.264278 .9082917 0.33 0.744 .3092548 5.168552

sp75\_1400\_1\_ss\_1lag | 1 (omitted)

sp75\_1403\_10\_ss\_1lag | 11.29805 11.87378 2.31 0.021 1.440212 88.63006

sp75\_1403\_5\_ss\_1lag | .8982227 .276871 -0.35 0.728 .4909157 1.643467

sp75\_1403\_6\_ss\_1lag | 1.228965 .2732245 0.93 0.354 .7948769 1.900113

sp75\_1403\_7\_ss\_1lag | .3480221 .1023241 -3.59 0.000 .195587 .619261

sp75\_1403\_8\_ss\_1lag | 2.48199 3.464585 0.65 0.515 .1609223 38.28104

sp75\_1404\_ss\_1lag | 1 (omitted)

sp75\_1404\_1\_ss\_1lag | .0596299 .0457681 -3.67 0.000 .0132476 .2684061

sp75\_1405\_ss\_1lag | 1 (omitted)

sp75\_1405\_1\_ss\_1lag | 1 (omitted)

sp75\_153\_ss\_1lag | 1 (omitted)

sp75\_155\_ss\_1lag | 1 (omitted)

sp75\_156\_ss\_1lag | 1 (omitted)

sp75\_1719\_2\_ss\_1lag | 0 0 -0.05 0.963 0 .

sp75\_1719\_4\_ss\_1lag | 1 (omitted)

sp75\_1720\_ss\_1lag | .9420847 .1658388 -0.34 0.735 .6671902 1.330241

sp75\_1725\_ss\_1lag | 1.028409 .0403877 0.71 0.476 .9522209 1.110694

sp75\_1906\_ss\_1lag | 1 (omitted)

sp75\_1916\_ss\_1lag | 1 (omitted)

sp75\_203\_ss\_1lag | .9866254 .0613605 -0.22 0.829 .8734019 1.114527

sp75\_204\_ss\_1lag | 1.527469 .2932795 2.21 0.027 1.048429 2.22539

sp75\_205\_ss\_1lag | 1 (omitted)

sp75\_207\_ss\_1lag | 1 (omitted)

sp75\_208\_ss\_1lag | .8334909 .0745677 -2.04 0.042 .6994371 .9932374

sp75\_209\_ss\_1lag | 1.068935 .2520888 0.28 0.777 .6733034 1.697038

sp75\_212\_ss\_1lag | 5.62392 4.022597 2.41 0.016 1.384216 22.84938

sp75\_213\_ss\_1lag | 1 (omitted)

sp75\_215\_ss\_1lag | 1 (omitted)

sp75\_332\_ss\_1lag | .3325609 .1656921 -2.21 0.027 .1252497 .8830107

sp75\_334\_ss\_1lag | .9149795 .2846989 -0.29 0.775 .4972298 1.683703

sp75\_337\_ss\_1lag | .6922803 .2806864 -0.91 0.364 .3127236 1.53251

sp75\_340\_ss\_1lag | 1.247915 .2244074 1.23 0.218 .8772369 1.775223

sp75\_343\_ss\_1lag | 1 (omitted)

sp75\_373\_ss\_1lag | 1 (omitted)

sp75\_388\_ss\_1lag | 1.046617 .2284195 0.21 0.835 .6823655 1.60531

sp75\_389\_ss\_1lag | .2731911 .211691 -1.67 0.094 .0598253 1.247521

sp75\_500\_ss\_1lag | 1.477605 1.265128 0.46 0.648 .2759043 7.913313

sp75\_500\_1\_ss\_1lag | 1 (omitted)

sp75\_501\_ss\_1lag | .0462333 .0462831 -3.07 0.002 .0064988 .3289075

sp75\_501\_2\_ss\_1lag | .1893371 .1480083 -2.13 0.033 .0409106 .8762656

sp75\_502\_ss\_1lag | .2491835 .2661964 -1.30 0.193 .0307045 2.022257

sp75\_503\_ss\_1lag | 1.060509 .0463249 1.34 0.179 .9734924 1.155304

sp75\_505\_ss\_1lag | 1 (omitted)

sp75\_506\_1\_ss\_1lag | 1 (omitted)

sp75\_507\_ss\_1lag | 2.50593 2.196817 1.05 0.295 .4495372 13.96923

sp75\_507\_1\_ss\_1lag | .9101033 .3568042 -0.24 0.810 .4220644 1.962468

sp75\_509\_ss\_1lag | 2.400724 2.057754 1.02 0.307 .4474496 12.88073

sp75\_512\_1\_ss\_1lag | .0950697 .0963222 -2.32 0.020 .0130505 .6925603

sp75\_523\_ss\_1lag | .8299955 .0898359 -1.72 0.085 .6713431 1.026141

sp75\_523\_3\_ss\_1lag | .9264422 .0506599 -1.40 0.162 .8322864 1.03125

sp75\_524\_ss\_1lag | 1 (omitted)

sp75\_602\_ss\_1lag | .5715855 .2518685 -1.27 0.204 .2409906 1.355696

sp75\_603\_ss\_1lag | .7306924 .3122863 -0.73 0.463 .3161875 1.688591

sp75\_604\_ss\_1lag | 1.042839 .0468744 0.93 0.351 .9548979 1.13888

sp75\_605\_ss\_1lag | 1.160283 .1984578 0.87 0.385 .8297979 1.622392

sp75\_606\_ss\_1lag | .907834 .0835734 -1.05 0.294 .7579604 1.087342

sp75\_607\_ss\_1lag | 1.770188 .9157956 1.10 0.270 .6421786 4.879588

sp75\_703\_3\_ss\_1lag | 1 (omitted)

sp75\_807\_ss\_1lag | 1.107715 .1660768 0.68 0.495 .8256758 1.486095

sp75\_810\_ss\_1lag | .6917179 .437488 -0.58 0.560 .2002502 2.389379

sp75\_811\_ss\_1lag | .2475265 .1944217 -1.78 0.075 .0530931 1.153998

sp75\_812\_ss\_1lag | 1 (omitted)

sp75\_816\_ss\_1lag | .4710099 .2111971 -1.68 0.093 .1955951 1.134232

sp75\_817\_ss\_1lag | 1 (omitted)

sp75\_906\_ss\_1lag | .3225676 .1895911 -1.93 0.054 .1019346 1.020751

mine\_time | 1.012093 .0200624 0.61 0.544 .9735255 1.052188

onsite\_insp\_hours | 1.003722 .0004468 8.35 0.000 1.002847 1.004598

|

state |

1 | .9800414 .7525712 -0.03 0.979 .217575 4.414483

2 | .6070687 .086532 -3.50 0.000 .4590997 .8027284

3 | 1.282646 .5596033 0.57 0.568 .545428 3.01631

4 | 4.453505 3.481951 1.91 0.056 .9620427 20.61625

5 | .8660191 .4460735 -0.28 0.780 .3155631 2.376669

6 | .4924367 .0722012 -4.83 0.000 .3694426 .6563777

7 | 2.314844 2.684253 0.72 0.469 .2384973 22.46778

8 | .8212248 .1154294 -1.40 0.161 .6234752 1.081695

9 | .1995608 .0288204 -11.16 0.000 .1503646 .2648529

10 | .666411 .2695686 -1.00 0.316 .3015951 1.472516

11 | 2.903845 2.488672 1.24 0.214 .5413417 15.5767

12 | .5182713 .112071 -3.04 0.002 .3392293 .79181

13 | 2.012178 1.313502 1.07 0.284 .5597862 7.232866

14 | .4120404 .1731163 -2.11 0.035 .1808475 .9387867

15 | .6363999 .1128398 -2.55 0.011 .4495769 .9008579

17 | 1 (empty)

|

time |

2000 | .9861063 .1909296 -0.07 0.942 .6747057 1.441229

2002 | .6910777 .1357821 -1.88 0.060 .4702013 1.01571

2003 | .9164239 .2106425 -0.38 0.704 .5840439 1.437962

2004 | .5260256 .1153935 -2.93 0.003 .3421999 .8086002

2005 | .4892886 .1041697 -3.36 0.001 .3223621 .7426534

2006 | .5049847 .1100265 -3.14 0.002 .3294714 .7739961

2007 | .3182104 .0708284 -5.14 0.000 .2057078 .4922412

2008 | .2323628 .052618 -6.45 0.000 .1490782 .3621756

2009 | .2764536 .0714052 -4.98 0.000 .1666347 .4586476

2010 | .2010324 .0506096 -6.37 0.000 .1227375 .329272

2011 | .2474398 .0644515 -5.36 0.000 .1485095 .4122731

2012 | .1708601 .0430764 -7.01 0.000 .1042412 .2800538

2013 | .2474537 .073159 -4.72 0.000 .1386241 .4417222

2014 | .1557797 .0462704 -6.26 0.000 .0870329 .2788293

2015 | .1104901 .0354588 -6.86 0.000 .0589051 .2072496

|

\_cons | .0001306 .0000239 -48.98 0.000 .0000913 .0001868

lnhours | 1 (offset)

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

Note: 1 failure and 29 successes completely determined.

Warning: convergence not achieved

(est1 stored)

**. lfit**

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

number of observations = 5798

number of covariate patterns = 5783

Pearson chi2(5693) = 7981.02

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -2741.2503

Iteration 1: log likelihood = -2013.1251

Iteration 2: log likelihood = -1701.4869

Iteration 3: log likelihood = -1683.1625

Iteration 4: log likelihood = -1683.0959

Iteration 5: log likelihood = -1683.0959

Logistic regression Number of obs = 5,798

LR chi2(1) = 2116.31

Prob > chi2 = 0.0000

Log likelihood = -1683.0959 Pseudo R2 = 0.3860

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

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

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

\_hat | 1.070691 .0353782 30.26 0.000 1.001351 1.140031

\_hatsq | 3.52e-07 1.16e-08 30.26 0.000 3.29e-07 3.74e-07

\_cons | -.0671919 .054882 -1.22 0.221 -.1747586 .0403749

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

Note: 0 failures and 43 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4577 584 | 5161

- | 172 465 | 637

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

Total | 4749 1049 | 5798

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

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

Sensitivity Pr( +| D) 96.38%

Specificity Pr( -|~D) 44.33%

Positive predictive value Pr( D| +) 88.68%

Negative predictive value Pr(~D| -) 73.00%

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

False + rate for true ~D Pr( +|~D) 55.67%

False - rate for true D Pr( -| D) 3.62%

False + rate for classified + Pr(~D| +) 11.32%

False - rate for classified - Pr( D| -) 27.00%

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

Correctly classified 86.96%

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

**. summ dv\_indicator bssv2\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bssv2\_yhat | 5,798 .8189031 .2332324 0 1