. // Model PS.Y.B.SP.SSV.3

**. eststo: logit dv\_indicator `ss\_lag\_4\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) offset(lnhours) iter(50) or**

note: sp48\_4\_ss\_c\_4lag != 0 predicts success perfectly

sp48\_4\_ss\_c\_4lag dropped and 3 obs not used

note: sp75\_1003\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1003\_ss\_c\_4lag dropped and 123 obs not used

note: sp75\_1003\_2\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1003\_2\_ss\_c\_4lag dropped and 1 obs not used

note: sp75\_1322\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1322\_ss\_c\_4lag dropped and 1 obs not used

note: sp75\_1318\_ss\_c\_4lag != 0 predicts failure perfectly

sp75\_1318\_ss\_c\_4lag dropped and 1 obs not used

note: sp75\_1400\_1\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1400\_1\_ss\_c\_4lag dropped and 7 obs not used

note: sp75\_1403\_8\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1403\_8\_ss\_c\_4lag dropped and 159 obs not used

note: sp75\_1404\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1404\_ss\_c\_4lag dropped and 2 obs not used

note: sp75\_1405\_1\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1405\_1\_ss\_c\_4lag dropped and 2 obs not used

note: sp75\_156\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_156\_ss\_c\_4lag dropped and 2 obs not used

note: sp75\_1719\_4\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1719\_4\_ss\_c\_4lag dropped and 25 obs not used

note: sp75\_1906\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1906\_ss\_c\_4lag dropped and 6 obs not used

note: sp75\_1916\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_1916\_ss\_c\_4lag dropped and 62 obs not used

note: sp75\_205\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_205\_ss\_c\_4lag dropped and 15 obs not used

note: sp75\_213\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_213\_ss\_c\_4lag dropped and 4 obs not used

note: sp75\_215\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_215\_ss\_c\_4lag dropped and 4 obs not used

note: sp75\_343\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_343\_ss\_c\_4lag dropped and 14 obs not used

note: sp75\_505\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_505\_ss\_c\_4lag dropped and 10 obs not used

note: sp75\_524\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_524\_ss\_c\_4lag dropped and 9 obs not used

note: sp75\_812\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_812\_ss\_c\_4lag dropped and 13 obs not used

note: sp75\_817\_ss\_c\_4lag != 0 predicts success perfectly

sp75\_817\_ss\_c\_4lag dropped and 5 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 9 obs not used

note: sp75\_153\_ss\_c\_4lag omitted because of collinearity

note: sp75\_155\_ss\_c\_4lag omitted because of collinearity

note: sp75\_373\_ss\_c\_4lag omitted because of collinearity

note: sp75\_500\_1\_ss\_c\_4lag omitted because of collinearity

Iteration 0: log pseudolikelihood = -1931.682

Iteration 1: log pseudolikelihood = -1713.4463

Iteration 2: log pseudolikelihood = -1678.358

Iteration 3: log pseudolikelihood = -1675.5648

Iteration 4: log pseudolikelihood = -1673.8065

Iteration 5: log pseudolikelihood = -1673.4475

Iteration 6: log pseudolikelihood = -1672.9749

Iteration 7: log pseudolikelihood = -1672.7357

Iteration 8: log pseudolikelihood = -1672.729

Iteration 9: log pseudolikelihood = -1672.729

Logistic regression Number of obs = 5,776

Wald chi2(89) = .

Log pseudolikelihood = -1672.729 Prob > chi2 = .

(Std. Err. adjusted for 1,226 clusters in mineid)

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

| Robust

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

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

sp48\_11\_ss\_c\_4lag | 1.474402 .3130632 1.83 0.067 .972475 2.235391

sp48\_25\_ss\_c\_4lag | 1.237933 .469002 0.56 0.573 .5891306 2.601252

sp48\_26\_ss\_c\_4lag | 1.221423 .2031441 1.20 0.229 .8816505 1.692139

sp48\_27\_ss\_c\_4lag | .8043472 .216825 -0.81 0.419 .4742291 1.364265

sp48\_28\_ss\_c\_4lag | 1.37458 .3929918 1.11 0.266 .7848952 2.407288

sp48\_4\_ss\_c\_4lag | 1 (omitted)

sp48\_5\_ss\_c\_4lag | 1.093458 .2908343 0.34 0.737 .6492353 1.841627

sp48\_6\_ss\_c\_4lag | .7942484 .1135294 -1.61 0.107 .6001863 1.051058

sp48\_7\_ss\_c\_4lag | 1.019074 .1432174 0.13 0.893 .7737141 1.342242

sp48\_8\_ss\_c\_4lag | 1.287481 .2660786 1.22 0.221 .85867 1.930435

sp75\_100\_ss\_c\_4lag | .8366518 .3021895 -0.49 0.621 .4121925 1.698202

sp75\_1002\_ss\_c\_4lag | 1.338065 .2619949 1.49 0.137 .9116139 1.96401

sp75\_1003\_ss\_c\_4lag | 1 (omitted)

sp75\_1003\_2\_ss\_c\_4lag | 1 (omitted)

sp75\_1311\_ss\_c\_4lag | .7142615 .3560956 -0.67 0.500 .2688376 1.897686

sp75\_1315\_ss\_c\_4lag | .5468427 .1487769 -2.22 0.027 .3208338 .9320618

sp75\_1316\_ss\_c\_4lag | .693616 .1577309 -1.61 0.108 .4441735 1.083143

sp75\_1318\_ss\_c\_4lag | 1 (omitted)

sp75\_1322\_ss\_c\_4lag | 1 (omitted)

sp75\_1400\_ss\_c\_4lag | .9953199 .1797669 -0.03 0.979 .6985948 1.418078

sp75\_1400\_1\_ss\_c\_4lag | 1 (omitted)

sp75\_1403\_10\_ss\_c\_4lag | 1.534261 .2929087 2.24 0.025 1.055345 2.230507

sp75\_1403\_5\_ss\_c\_4lag | .9796276 .0903094 -0.22 0.823 .8176941 1.17363

sp75\_1403\_6\_ss\_c\_4lag | 1.03057 .0811875 0.38 0.702 .883122 1.202637

sp75\_1403\_7\_ss\_c\_4lag | .8136937 .0941925 -1.78 0.075 .6485247 1.020929

sp75\_1403\_8\_ss\_c\_4lag | 1 (omitted)

sp75\_1404\_ss\_c\_4lag | 1 (omitted)

sp75\_1404\_1\_ss\_c\_4lag | .3337169 .1426616 -2.57 0.010 .1443762 .7713667

sp75\_1405\_ss\_c\_4lag | 1.715197 .7165576 1.29 0.197 .756324 3.889738

sp75\_1405\_1\_ss\_c\_4lag | 1 (omitted)

sp75\_153\_ss\_c\_4lag | 1 (omitted)

sp75\_155\_ss\_c\_4lag | 1 (omitted)

sp75\_156\_ss\_c\_4lag | 1 (omitted)

sp75\_1719\_2\_ss\_c\_4lag | .229357 .0240031 -14.07 0.000 .1868231 .2815745

sp75\_1719\_4\_ss\_c\_4lag | 1 (omitted)

sp75\_1720\_ss\_c\_4lag | 1.025318 .0603081 0.43 0.671 .9136754 1.150603

sp75\_1725\_ss\_c\_4lag | 1.005734 .0117997 0.49 0.626 .982871 1.029129

sp75\_1906\_ss\_c\_4lag | 1 (omitted)

sp75\_1916\_ss\_c\_4lag | 1 (omitted)

sp75\_203\_ss\_c\_4lag | .9968864 .0183056 -0.17 0.865 .961646 1.033418

sp75\_204\_ss\_c\_4lag | 1.132116 .0672094 2.09 0.037 1.007762 1.271813

sp75\_205\_ss\_c\_4lag | 1 (omitted)

sp75\_207\_ss\_c\_4lag | 2.339129 1.285076 1.55 0.122 .7969283 6.86577

sp75\_208\_ss\_c\_4lag | .9140103 .0262751 -3.13 0.002 .863936 .9669869

sp75\_209\_ss\_c\_4lag | 1.026255 .0887253 0.30 0.764 .8662924 1.215756

sp75\_212\_ss\_c\_4lag | 1.228229 .1778757 1.42 0.156 .9247107 1.631372

sp75\_213\_ss\_c\_4lag | 1 (omitted)

sp75\_215\_ss\_c\_4lag | 1 (omitted)

sp75\_332\_ss\_c\_4lag | .6934934 .1188134 -2.14 0.033 .4956892 .9702312

sp75\_334\_ss\_c\_4lag | 1.036749 .1047274 0.36 0.721 .8505289 1.26374

sp75\_337\_ss\_c\_4lag | .8676838 .1056252 -1.17 0.244 .6835066 1.101489

sp75\_340\_ss\_c\_4lag | 1.094535 .0663688 1.49 0.136 .9718866 1.23266

sp75\_343\_ss\_c\_4lag | 1 (omitted)

sp75\_373\_ss\_c\_4lag | 1 (omitted)

sp75\_388\_ss\_c\_4lag | 1.029116 .0762593 0.39 0.699 .8899979 1.189981

sp75\_389\_ss\_c\_4lag | .8221998 .2200244 -0.73 0.464 .4866222 1.389194

sp75\_500\_ss\_c\_4lag | 1.169922 .2792031 0.66 0.511 .7328526 1.867656

sp75\_500\_1\_ss\_c\_4lag | 1 (omitted)

sp75\_501\_ss\_c\_4lag | .5251922 .2595895 -1.30 0.193 .1993382 1.383713

sp75\_501\_2\_ss\_c\_4lag | .4542532 .1025263 -3.50 0.000 .2918631 .7069956

sp75\_502\_ss\_c\_4lag | .6848678 .1914456 -1.35 0.176 .3959723 1.184537

sp75\_503\_ss\_c\_4lag | 1.021196 .0154426 1.39 0.165 .9913737 1.051916

sp75\_505\_ss\_c\_4lag | 1 (omitted)

sp75\_506\_1\_ss\_c\_4lag | .7792816 .2961828 -0.66 0.512 .3699789 1.641391

sp75\_507\_ss\_c\_4lag | 1.142864 .1817998 0.84 0.401 .8367403 1.560984

sp75\_507\_1\_ss\_c\_4lag | .9310001 .1139907 -0.58 0.559 .7323682 1.183505

sp75\_509\_ss\_c\_4lag | 1.537981 .7034316 0.94 0.347 .6275293 3.769363

sp75\_512\_1\_ss\_c\_4lag | .2628658 .2041426 -1.72 0.085 .0573703 1.204428

sp75\_523\_ss\_c\_4lag | .9329336 .0327278 -1.98 0.048 .8709438 .9993356

sp75\_523\_3\_ss\_c\_4lag | .9792403 .0175882 -1.17 0.243 .9453679 1.014326

sp75\_524\_ss\_c\_4lag | 1 (omitted)

sp75\_602\_ss\_c\_4lag | .8866826 .1962379 -0.54 0.587 .5746228 1.368212

sp75\_603\_ss\_c\_4lag | .93046 .156934 -0.43 0.669 .6685466 1.294982

sp75\_604\_ss\_c\_4lag | 1.020544 .0169369 1.23 0.220 .9878819 1.054285

sp75\_605\_ss\_c\_4lag | 1.041626 .0637766 0.67 0.505 .9238351 1.174435

sp75\_606\_ss\_c\_4lag | .9465436 .0255318 -2.04 0.042 .897802 .9979313

sp75\_607\_ss\_c\_4lag | 1.325656 .2257092 1.66 0.098 .9495183 1.850795

sp75\_703\_3\_ss\_c\_4lag | 2.025941 .8111721 1.76 0.078 .924298 4.440601

sp75\_807\_ss\_c\_4lag | 1.005255 .0475612 0.11 0.912 .9162285 1.102932

sp75\_810\_ss\_c\_4lag | .7835266 .1382036 -1.38 0.167 .5545149 1.107119

sp75\_811\_ss\_c\_4lag | .5128168 .1980433 -1.73 0.084 .2405687 1.093164

sp75\_812\_ss\_c\_4lag | 1 (omitted)

sp75\_816\_ss\_c\_4lag | .7460399 .1223402 -1.79 0.074 .5409745 1.028839

sp75\_817\_ss\_c\_4lag | 1 (omitted)

sp75\_906\_ss\_c\_4lag | .7470339 .1892583 -1.15 0.250 .4546649 1.227409

mine\_time | 1.008996 .0197348 0.46 0.647 .9710483 1.048426

onsite\_insp\_hours | 1.00372 .0004531 8.23 0.000 1.002832 1.004608

|

state |

1 | 1.068396 .7571437 0.09 0.926 .2663843 4.285051

2 | .587426 .0821055 -3.81 0.000 .4466623 .7725506

3 | 1.21239 .5494179 0.42 0.671 .4987743 2.947004

4 | 4.433395 3.439873 1.92 0.055 .9689219 20.28542

5 | .8618251 .4391934 -0.29 0.770 .3174239 2.339907

6 | .5082685 .074369 -4.63 0.000 .3815459 .6770794

7 | 2.381071 3.0302 0.68 0.495 .1965694 28.84223

8 | .8574337 .1177845 -1.12 0.263 .6550464 1.122352

9 | .2021452 .0298937 -10.81 0.000 .1512815 .2701103

10 | .6923151 .2890239 -0.88 0.378 .3054562 1.569129

11 | 2.386375 2.031881 1.02 0.307 .449762 12.66178

12 | .5098035 .1105877 -3.11 0.002 .3332409 .779915

13 | 1.955953 1.258129 1.04 0.297 .5544211 6.900448

14 | .436819 .1782035 -2.03 0.042 .1963576 .9717519

15 | .6452394 .1136147 -2.49 0.013 .4569198 .9111749

17 | 1 (empty)

|

time |

2000 | .9384504 .1802645 -0.33 0.741 .6440302 1.367466

2002 | .6881562 .1341355 -1.92 0.055 .4696461 1.008331

2003 | .9323333 .2208471 -0.30 0.767 .5860602 1.483202

2004 | .5076898 .110405 -3.12 0.002 .3315061 .777509

2005 | .4703148 .1002044 -3.54 0.000 .3097656 .7140754

2006 | .4975559 .1079002 -3.22 0.001 .3252744 .7610861

2007 | .3023333 .0664685 -5.44 0.000 .1964933 .4651835

2008 | .2247166 .0503173 -6.67 0.000 .1448901 .3485231

2009 | .2841981 .0732226 -4.88 0.000 .171519 .4709014

2010 | .190788 .0481678 -6.56 0.000 .1163188 .3129335

2011 | .2294412 .0599871 -5.63 0.000 .137444 .3830159

2012 | .1676439 .0425822 -7.03 0.000 .1019011 .2758013

2013 | .2391315 .0706265 -4.84 0.000 .1340411 .4266147

2014 | .1504739 .045424 -6.27 0.000 .0832734 .2719041

2015 | .1066996 .0341948 -6.98 0.000 .0569341 .1999648

|

\_cons | .0001363 .0000251 -48.36 0.000 .000095 .0001954

lnhours | 1 (offset)

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

Note: 0 failures and 31 successes completely determined.

(est1 stored)

**. lfit**

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

number of observations = 5776

number of covariate patterns = 5760

Pearson chi2(5667) = 8686.59

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -2735.3443

Iteration 1: log likelihood = -1891.9651

Iteration 2: log likelihood = -1699.1915

Iteration 3: log likelihood = -1676.3814

Iteration 4: log likelihood = -1664.2346

Iteration 5: log likelihood = -1663.2904

Iteration 6: log likelihood = -1663.2875

Iteration 7: log likelihood = -1663.2875

Logistic regression Number of obs = 5,776

LR chi2(2) = 2144.11

Prob > chi2 = 0.0000

Log likelihood = -1663.2875 Pseudo R2 = 0.3919

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

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

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

\_hat | .978429 .0412662 23.71 0.000 .8975487 1.059309

\_hatsq | .0652804 .0175221 3.73 0.000 .0309378 .0996231

\_cons | -.1342886 .0566592 -2.37 0.018 -.2453386 -.0232385

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

Note: 0 failures and 180 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4560 575 | 5135

- | 168 473 | 641

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

Total | 4728 1048 | 5776

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

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

Sensitivity Pr( +| D) 96.45%

Specificity Pr( -|~D) 45.13%

Positive predictive value Pr( D| +) 88.80%

Negative predictive value Pr(~D| -) 73.79%

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

False + rate for true ~D Pr( +|~D) 54.87%

False - rate for true D Pr( -| D) 3.55%

False + rate for classified + Pr(~D| +) 11.20%

False - rate for classified - Pr( D| -) 26.21%

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

Correctly classified 87.14%

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

**. summ dv\_indicator bssv3\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bssv3\_yhat | 5,776 .8185596 .2336321 .002428 1