. // Model PS.Y.B.SP.SSV.4

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

note: sp75\_100\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_100\_ss\_c\_lag\_all dropped and 44 obs not used

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

sp75\_1003\_ss\_c\_lag\_all dropped and 168 obs not used

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

sp75\_1400\_1\_ss\_c\_lag\_all dropped and 22 obs not used

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

sp75\_1404\_ss\_c\_lag\_all dropped and 12 obs not used

note: sp75\_1404\_1\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_1404\_1\_ss\_c\_lag\_all dropped and 36 obs not used

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

sp75\_153\_ss\_c\_lag\_all dropped and 12 obs not used

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

sp75\_155\_ss\_c\_lag\_all dropped and 3 obs not used

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

sp75\_156\_ss\_c\_lag\_all dropped and 6 obs not used

note: sp75\_1719\_2\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_1719\_2\_ss\_c\_lag\_all dropped and 12 obs not used

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

sp75\_1719\_4\_ss\_c\_lag\_all dropped and 27 obs not used

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

sp75\_1906\_ss\_c\_lag\_all dropped and 15 obs not used

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

sp75\_205\_ss\_c\_lag\_all dropped and 38 obs not used

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

sp75\_213\_ss\_c\_lag\_all dropped and 2 obs not used

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

sp75\_215\_ss\_c\_lag\_all dropped and 1 obs not used

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

sp75\_343\_ss\_c\_lag\_all dropped and 26 obs not used

note: sp75\_500\_1\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_500\_1\_ss\_c\_lag\_all dropped and 1 obs not used

note: sp75\_501\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_501\_ss\_c\_lag\_all dropped and 30 obs not used

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

sp75\_505\_ss\_c\_lag\_all dropped and 12 obs not used

note: sp75\_512\_1\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_512\_1\_ss\_c\_lag\_all dropped and 13 obs not used

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

sp75\_812\_ss\_c\_lag\_all dropped and 52 obs not used

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

sp75\_817\_ss\_c\_lag\_all dropped and 7 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 4 obs not used

note: sp48\_4\_ss\_c\_lag\_all omitted because of collinearity

note: sp75\_1003\_2\_ss\_c\_lag\_all omitted because of collinearity

note: sp75\_1322\_ss\_c\_lag\_all omitted because of collinearity

note: sp75\_373\_ss\_c\_lag\_all omitted because of collinearity

Iteration 0: log pseudolikelihood = -1929.6578

Iteration 1: log pseudolikelihood = -1706.3639

Iteration 2: log pseudolikelihood = -1670.0183

Iteration 3: log pseudolikelihood = -1662.9012

Iteration 4: log pseudolikelihood = -1660.7846

Iteration 5: log pseudolikelihood = -1660.1694

Iteration 6: log pseudolikelihood = -1660.1235

Iteration 7: log pseudolikelihood = -1660.1231

Iteration 8: log pseudolikelihood = -1660.1231

Logistic regression Number of obs = 5,710

Wald chi2(87) = .

Log pseudolikelihood = -1660.1231 Prob > chi2 = .

(Std. Err. adjusted for 1,216 clusters in mineid)

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

| Robust

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

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

sp48\_11\_ss\_c\_lag\_all | 1.094574 .1562419 0.63 0.527 .827452 1.44793

sp48\_25\_ss\_c\_lag\_all | 1.285642 .1730537 1.87 0.062 .9875161 1.673771

sp48\_26\_ss\_c\_lag\_all | 1.044968 .0735773 0.62 0.532 .9102675 1.199602

sp48\_27\_ss\_c\_lag\_all | 1.068416 .1559255 0.45 0.650 .8026301 1.422216

sp48\_28\_ss\_c\_lag\_all | .8787273 .0928827 -1.22 0.221 .7143004 1.081004

sp48\_4\_ss\_c\_lag\_all | 1 (omitted)

sp48\_5\_ss\_c\_lag\_all | 1.158589 .2598234 0.66 0.512 .7465183 1.79812

sp48\_6\_ss\_c\_lag\_all | .9705129 .0888675 -0.33 0.744 .8110709 1.161298

sp48\_7\_ss\_c\_lag\_all | .8842192 .0743098 -1.46 0.143 .7499373 1.042545

sp48\_8\_ss\_c\_lag\_all | 1.037866 .1305062 0.30 0.768 .8111609 1.32793

sp75\_100\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1002\_ss\_c\_lag\_all | 1.001025 .0799105 0.01 0.990 .8560411 1.170564

sp75\_1003\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1003\_2\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1311\_ss\_c\_lag\_all | .9396616 .1603904 -0.36 0.715 .6724814 1.312994

sp75\_1315\_ss\_c\_lag\_all | .5763116 .1388961 -2.29 0.022 .3593439 .9242817

sp75\_1316\_ss\_c\_lag\_all | .5920688 .1506465 -2.06 0.039 .3595768 .9748833

sp75\_1318\_ss\_c\_lag\_all | .8253786 .1048896 -1.51 0.131 .6434015 1.058825

sp75\_1322\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1400\_ss\_c\_lag\_all | .8005279 .1586739 -1.12 0.262 .5428233 1.180577

sp75\_1400\_1\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1403\_10\_ss\_c\_lag\_all | 1.135636 .0597432 2.42 0.016 1.024376 1.25898

sp75\_1403\_5\_ss\_c\_lag\_all | 1.006657 .0204443 0.33 0.744 .9673745 1.047536

sp75\_1403\_6\_ss\_c\_lag\_all | .9945849 .0273422 -0.20 0.843 .9424134 1.049645

sp75\_1403\_7\_ss\_c\_lag\_all | .9491544 .0587491 -0.84 0.399 .8407187 1.071576

sp75\_1403\_8\_ss\_c\_lag\_all | 1.11309 .1341086 0.89 0.374 .8789714 1.409567

sp75\_1404\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1404\_1\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1405\_ss\_c\_lag\_all | 3.032003 1.789283 1.88 0.060 .953692 9.639425

sp75\_1405\_1\_ss\_c\_lag\_all | .6968114 .0745415 -3.38 0.001 .5650123 .859355

sp75\_153\_ss\_c\_lag\_all | 1 (omitted)

sp75\_155\_ss\_c\_lag\_all | 1 (omitted)

sp75\_156\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1719\_2\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1719\_4\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1720\_ss\_c\_lag\_all | 1.015229 .0333097 0.46 0.645 .9519978 1.082659

sp75\_1725\_ss\_c\_lag\_all | 1.001176 .0045102 0.26 0.794 .9923745 1.010055

sp75\_1906\_ss\_c\_lag\_all | 1 (omitted)

sp75\_1916\_ss\_c\_lag\_all | .8694861 .1173702 -1.04 0.300 .6673608 1.13283

sp75\_203\_ss\_c\_lag\_all | 1.009562 .0129339 0.74 0.458 .9845279 1.035233

sp75\_204\_ss\_c\_lag\_all | 1.016981 .0456689 0.37 0.708 .9312975 1.110548

sp75\_205\_ss\_c\_lag\_all | 1 (omitted)

sp75\_207\_ss\_c\_lag\_all | 1.879672 .4941364 2.40 0.016 1.122831 3.146658

sp75\_208\_ss\_c\_lag\_all | .9571801 .0118248 -3.54 0.000 .9342823 .9806391

sp75\_209\_ss\_c\_lag\_all | 1.079612 .0735613 1.12 0.261 .9446471 1.23386

sp75\_212\_ss\_c\_lag\_all | .8156556 .0481809 -3.45 0.001 .7264844 .9157721

sp75\_213\_ss\_c\_lag\_all | 1 (omitted)

sp75\_215\_ss\_c\_lag\_all | 1 (omitted)

sp75\_332\_ss\_c\_lag\_all | .9945718 .1434188 -0.04 0.970 .7497069 1.319413

sp75\_334\_ss\_c\_lag\_all | .9579319 .0558687 -0.74 0.461 .8544579 1.073936

sp75\_337\_ss\_c\_lag\_all | .8235397 .1033798 -1.55 0.122 .6439205 1.053263

sp75\_340\_ss\_c\_lag\_all | 1.090987 .0252895 3.76 0.000 1.04253 1.141697

sp75\_343\_ss\_c\_lag\_all | 1 (omitted)

sp75\_373\_ss\_c\_lag\_all | 1 (omitted)

sp75\_388\_ss\_c\_lag\_all | 1.000039 .0325579 0.00 0.999 .9382196 1.065931

sp75\_389\_ss\_c\_lag\_all | .9418723 .1482925 -0.38 0.704 .6917914 1.282357

sp75\_500\_ss\_c\_lag\_all | 1.311681 .1503178 2.37 0.018 1.047807 1.642009

sp75\_500\_1\_ss\_c\_lag\_all | 1 (omitted)

sp75\_501\_ss\_c\_lag\_all | 1 (omitted)

sp75\_501\_2\_ss\_c\_lag\_all | .7408081 .1613627 -1.38 0.168 .4833895 1.13531

sp75\_502\_ss\_c\_lag\_all | .9090865 .275568 -0.31 0.753 .5018612 1.646747

sp75\_503\_ss\_c\_lag\_all | 1.000631 .0050079 0.13 0.900 .9908638 1.010495

sp75\_505\_ss\_c\_lag\_all | 1 (omitted)

sp75\_506\_1\_ss\_c\_lag\_all | .7380489 .1429645 -1.57 0.117 .5048963 1.078867

sp75\_507\_ss\_c\_lag\_all | 1.307428 .2462867 1.42 0.155 .9038009 1.891311

sp75\_507\_1\_ss\_c\_lag\_all | .9031723 .0710794 -1.29 0.196 .7740718 1.053804

sp75\_509\_ss\_c\_lag\_all | 1.966109 .3307761 4.02 0.000 1.413846 2.73409

sp75\_512\_1\_ss\_c\_lag\_all | 1 (omitted)

sp75\_523\_ss\_c\_lag\_all | .9798597 .0162363 -1.23 0.219 .9485483 1.012205

sp75\_523\_3\_ss\_c\_lag\_all | 1.007293 .009364 0.78 0.434 .9891063 1.025815

sp75\_524\_ss\_c\_lag\_all | .9794438 .0948148 -0.21 0.830 .8101755 1.184077

sp75\_602\_ss\_c\_lag\_all | 1.071549 .0916956 0.81 0.419 .9060917 1.267219

sp75\_603\_ss\_c\_lag\_all | 1.066955 .1184989 0.58 0.560 .8582417 1.326426

sp75\_604\_ss\_c\_lag\_all | 1.013828 .007264 1.92 0.055 .9996904 1.028166

sp75\_605\_ss\_c\_lag\_all | 1.059219 .0273349 2.23 0.026 1.006976 1.114173

sp75\_606\_ss\_c\_lag\_all | .9531565 .0126242 -3.62 0.000 .9287319 .9782234

sp75\_607\_ss\_c\_lag\_all | 1.311692 .1222342 2.91 0.004 1.092723 1.574541

sp75\_703\_3\_ss\_c\_lag\_all | 1.299678 .2131373 1.60 0.110 .9424214 1.792364

sp75\_807\_ss\_c\_lag\_all | .9564586 .0228064 -1.87 0.062 .9127873 1.002219

sp75\_810\_ss\_c\_lag\_all | .8482611 .076184 -1.83 0.067 .7113468 1.011527

sp75\_811\_ss\_c\_lag\_all | .7765384 .1587007 -1.24 0.216 .5202395 1.159104

sp75\_812\_ss\_c\_lag\_all | 1 (omitted)

sp75\_816\_ss\_c\_lag\_all | .9332066 .1055623 -0.61 0.541 .7476386 1.164834

sp75\_817\_ss\_c\_lag\_all | 1 (omitted)

sp75\_906\_ss\_c\_lag\_all | 1.01291 .2838017 0.05 0.963 .5848941 1.75414

mine\_time | .9984947 .0211444 -0.07 0.943 .9579007 1.040809

onsite\_insp\_hours | 1.003802 .0004183 9.11 0.000 1.002983 1.004622

|

state |

1 | 1.376101 .7846584 0.56 0.576 .450082 4.207352

2 | .7599577 .1111003 -1.88 0.060 .5706238 1.012113

3 | 1.028131 .5656576 0.05 0.960 .349731 3.022477

4 | 4.772525 3.457888 2.16 0.031 1.153502 19.74596

5 | 1.068241 .4965534 0.14 0.887 .4295393 2.656658

6 | .4980446 .0723042 -4.80 0.000 .374709 .6619761

7 | 3.052221 5.272529 0.65 0.518 .1033275 90.16042

8 | .7882113 .1081667 -1.73 0.083 .6023262 1.031463

9 | .2244313 .0418545 -8.01 0.000 .155719 .3234635

10 | .7425551 .3507524 -0.63 0.529 .2942091 1.874137

11 | 2.024856 2.00328 0.71 0.476 .2912479 14.0775

12 | .4786359 .1055549 -3.34 0.001 .3106615 .737434

13 | 1.855464 1.246688 0.92 0.358 .4971985 6.924294

14 | .4985148 .1988717 -1.74 0.081 .2280917 1.089548

15 | .6810358 .1250161 -2.09 0.036 .4752444 .9759395

17 | 1 (empty)

|

time |

2000 | .9830304 .1884841 -0.09 0.929 .6750865 1.431444

2002 | .6845481 .1353196 -1.92 0.055 .4646659 1.00848

2003 | .8986317 .2096313 -0.46 0.647 .5688725 1.419543

2004 | .5337483 .1188411 -2.82 0.005 .3449954 .8257712

2005 | .5017204 .1074741 -3.22 0.001 .3297045 .7634816

2006 | .5059222 .1124406 -3.07 0.002 .3272693 .7821

2007 | .3248889 .0727375 -5.02 0.000 .2094905 .503855

2008 | .2343135 .0526688 -6.46 0.000 .1508221 .3640236

2009 | .2766893 .0712248 -4.99 0.000 .167062 .4582548

2010 | .2009776 .0511884 -6.30 0.000 .121997 .3310902

2011 | .2376793 .0606179 -5.63 0.000 .1441784 .3918164

2012 | .1656313 .0418262 -7.12 0.000 .1009699 .2717021

2013 | .2377415 .0703898 -4.85 0.000 .1330711 .4247431

2014 | .1476818 .0445496 -6.34 0.000 .0817625 .2667471

2015 | .0945917 .0308018 -7.24 0.000 .0499663 .1790726

|

\_cons | .000133 .0000246 -48.26 0.000 .0000925 .0001911

lnhours | 1 (offset)

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

Note: 0 failures and 107 successes completely determined.

(est1 stored)

**. lfit**

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

number of observations = 5710

number of covariate patterns = 5695

Pearson chi2(5602) = 8387.98

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -2723.5382

Iteration 1: log likelihood = -2086.0997

Iteration 2: log likelihood = -2043.896

Iteration 3: log likelihood = -1666.9523

Iteration 4: log likelihood = -1650.7486

Iteration 5: log likelihood = -1650.4411

Iteration 6: log likelihood = -1650.4409

Iteration 7: log likelihood = -1650.4409

Logistic regression Number of obs = 5,710

LR chi2(2) = 2146.19

Prob > chi2 = 0.0000

Log likelihood = -1650.4409 Pseudo R2 = 0.3940

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

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

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

\_hat | .9750024 .0407631 23.92 0.000 .8951081 1.054897

\_hatsq | .0676977 .0174617 3.88 0.000 .0334734 .1019221

\_cons | -.13372 .0565728 -2.36 0.018 -.2446007 -.0228394

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

Note: 0 failures and 280 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4487 573 | 5060

- | 174 476 | 650

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

Total | 4661 1049 | 5710

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

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

Sensitivity Pr( +| D) 96.27%

Specificity Pr( -|~D) 45.38%

Positive predictive value Pr( D| +) 88.68%

Negative predictive value Pr(~D| -) 73.23%

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

False + rate for true ~D Pr( +|~D) 54.62%

False - rate for true D Pr( -| D) 3.73%

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

False - rate for classified - Pr( D| -) 26.77%

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

Correctly classified 86.92%

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

**. summ dv\_indicator bssv4\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bssv4\_yhat | 5,710 .8162872 .2356622 .002333 1