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

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

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

sp75\_1400\_1\_c\_lag\_all dropped and 31 obs not used

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

sp75\_1404\_1\_c\_lag\_all dropped and 47 obs not used

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

sp75\_500\_1\_c\_lag\_all dropped and 27 obs not used

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

sp75\_512\_1\_c\_lag\_all dropped and 29 obs not used

note: sp75\_1003\_2\_c\_lag\_all != 0 predicts success perfectly

sp75\_1003\_2\_c\_lag\_all dropped and 123 obs not used

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

sp75\_812\_c\_lag\_all dropped and 86 obs not used

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

sp75\_1003\_c\_lag\_all dropped and 63 obs not used

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

sp75\_153\_c\_lag\_all dropped and 19 obs not used

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

sp75\_343\_c\_lag\_all dropped and 94 obs not used

note: sp75\_703\_4\_c\_lag\_all != 0 predicts success perfectly

sp75\_703\_4\_c\_lag\_all dropped and 3 obs not used

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

sp75\_155\_c\_lag\_all dropped and 11 obs not used

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

sp75\_215\_c\_lag\_all dropped and 2 obs not used

note: sp75\_327\_c\_lag\_all != 0 predicts success perfectly

sp75\_327\_c\_lag\_all dropped and 3 obs not used

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

sp75\_817\_c\_lag\_all dropped and 17 obs not used

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

sp75\_100\_c\_lag\_all dropped and 80 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 4 obs not used

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

note: sp48\_24\_c\_lag\_all omitted because of collinearity

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

note: sp75\_510\_c\_lag\_all omitted because of collinearity

Iteration 0: log pseudolikelihood = -1918.9837

Iteration 1: log pseudolikelihood = -1687.6982

Iteration 2: log pseudolikelihood = -1649.711

Iteration 3: log pseudolikelihood = -1641.5955

Iteration 4: log pseudolikelihood = -1640.3433

Iteration 5: log pseudolikelihood = -1639.7592

Iteration 6: log pseudolikelihood = -1639.7582

Iteration 7: log pseudolikelihood = -1639.7582

Logistic regression Number of obs = 5,614

Wald chi2(99) = .

Log pseudolikelihood = -1639.7582 Prob > chi2 = .

(Std. Err. adjusted for 1,212 clusters in mineid)

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

| Robust

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

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

sp48\_11\_c\_lag\_all | 1.025297 .0530935 0.48 0.629 .9263421 1.134822

sp75\_1311\_c\_lag\_all | 1.142339 .1847809 0.82 0.411 .8319697 1.568493

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

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

sp75\_1405\_1\_c\_lag\_all | .4378362 .117933 -3.07 0.002 .258248 .7423118

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

sp75\_501\_c\_lag\_all | .9504792 .0594734 -0.81 0.417 .8407778 1.074494

sp75\_506\_1\_c\_lag\_all | .9475865 .0941863 -0.54 0.588 .7798533 1.151396

sp75\_507\_1\_c\_lag\_all | 1.00076 .0290114 0.03 0.979 .9454841 1.059268

sp75\_508\_1\_c\_lag\_all | .6984728 .1171331 -2.14 0.032 .50281 .9702756

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

sp75\_811\_c\_lag\_all | 1.201119 .1204721 1.83 0.068 .9867579 1.462047

sp75\_1002\_c\_lag\_all | .9771435 .04982 -0.45 0.650 .8842184 1.079834

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

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

sp75\_1719\_2\_c\_lag\_all | 1.074413 .2181759 0.35 0.724 .7216424 1.599634

sp75\_212\_c\_lag\_all | 1.036679 .0630066 0.59 0.553 .9202596 1.167826

sp75\_332\_c\_lag\_all | .8852067 .1008651 -1.07 0.285 .7080344 1.106713

sp75\_501\_2\_c\_lag\_all | .8106396 .0531438 -3.20 0.001 .7128938 .9217875

sp75\_502\_c\_lag\_all | .6862538 .1272382 -2.03 0.042 .4771596 .9869744

sp75\_602\_c\_lag\_all | 1.123089 .0570214 2.29 0.022 1.01671 1.240599

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

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

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

sp75\_203\_c\_lag\_all | 1.01691 .0135295 1.26 0.208 .9907352 1.043776

sp75\_213\_c\_lag\_all | 1.072869 .5409642 0.14 0.889 .3993488 2.882314

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

sp75\_373\_c\_lag\_all | .897034 .3769186 -0.26 0.796 .3936845 2.043946

sp75\_503\_c\_lag\_all | .9982228 .002737 -0.65 0.516 .9928728 1.003602

sp75\_523\_c\_lag\_all | 1.020332 .0189113 1.09 0.277 .9839319 1.058079

sp75\_523\_3\_c\_lag\_all | .987089 .0071828 -1.79 0.074 .9731109 1.001268

sp75\_603\_c\_lag\_all | 1.005003 .0672228 0.07 0.941 .8815203 1.145784

sp75\_703\_3\_c\_lag\_all | .9894815 .0653936 -0.16 0.873 .8692663 1.126322

sp48\_24\_c\_lag\_all | 1 (omitted)

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

sp75\_1404\_c\_lag\_all | .8597955 .0684731 -1.90 0.058 .7355403 1.005041

sp75\_1719\_4\_c\_lag\_all | 1.002666 .0873197 0.03 0.976 .8453319 1.189283

sp75\_204\_c\_lag\_all | 1.020928 .0230394 0.92 0.359 .9767553 1.067097

sp75\_334\_c\_lag\_all | .9865479 .0450776 -0.30 0.767 .902038 1.078975

sp75\_524\_c\_lag\_all | 1.142943 .215473 0.71 0.479 .7898634 1.653854

sp75\_604\_c\_lag\_all | 1.020022 .0073984 2.73 0.006 1.005624 1.034626

sp75\_703\_4\_c\_lag\_all | 1 (omitted)

sp48\_25\_c\_lag\_all | 1.043365 .0983338 0.45 0.652 .8673878 1.255045

sp48\_5\_c\_lag\_all | 1.05754 .1368746 0.43 0.666 .8205933 1.362905

sp75\_1315\_c\_lag\_all | .6881744 .1674491 -1.54 0.125 .4271507 1.108705

sp75\_1403\_5\_c\_lag\_all | .9767997 .0178204 -1.29 0.198 .9424895 1.012359

sp75\_1405\_c\_lag\_all | 1.415042 .3220489 1.53 0.127 .9058256 2.210517

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

sp75\_1725\_c\_lag\_all | .9960284 .0048136 -0.82 0.410 .9866384 1.005508

sp75\_205\_c\_lag\_all | .980665 .2226002 -0.09 0.931 .6285029 1.53015

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

sp75\_505\_c\_lag\_all | 1.559775 .3519553 1.97 0.049 1.002289 2.427344

sp75\_605\_c\_lag\_all | 1.042474 .0237585 1.83 0.068 .9969329 1.090096

sp48\_26\_c\_lag\_all | .9625936 .0329736 -1.11 0.266 .9000882 1.02944

sp48\_6\_c\_lag\_all | .9214389 .0568085 -1.33 0.184 .8165604 1.039788

sp75\_1316\_c\_lag\_all | .8758007 .1519705 -0.76 0.445 .6233088 1.230573

sp75\_1403\_6\_c\_lag\_all | .9788529 .0156611 -1.34 0.182 .9486339 1.010035

sp75\_156\_c\_lag\_all | .8376232 .2055526 -0.72 0.470 .5178023 1.354982

sp75\_1906\_c\_lag\_all | .8259054 .0982393 -1.61 0.108 .6541572 1.042746

sp75\_1916\_c\_lag\_all | 1.008501 .0823543 0.10 0.917 .8593438 1.183547

sp75\_606\_c\_lag\_all | .9857193 .0091538 -1.55 0.121 .9679405 1.003825

sp75\_816\_c\_lag\_all | 1.019533 .0385601 0.51 0.609 .9466902 1.097981

sp75\_906\_c\_lag\_all | 1.287627 .6456775 0.50 0.614 .4818999 3.440512

sp48\_27\_c\_lag\_all | .9495932 .0652613 -0.75 0.452 .829924 1.086518

sp48\_7\_c\_lag\_all | .9052004 .0512406 -1.76 0.078 .8101414 1.011413

sp75\_1403\_7\_c\_lag\_all | 1.007772 .0545958 0.14 0.886 .9062515 1.120665

sp75\_207\_c\_lag\_all | 1.36841 .1803153 2.38 0.017 1.056948 1.771655

sp75\_327\_c\_lag\_all | 1 (omitted)

sp75\_337\_c\_lag\_all | .9746913 .0449106 -0.56 0.578 .8905258 1.066811

sp75\_507\_c\_lag\_all | .9537776 .0372999 -1.21 0.226 .8834027 1.029759

sp75\_607\_c\_lag\_all | 1.114209 .0673751 1.79 0.074 .9896809 1.254405

sp75\_807\_c\_lag\_all | .9993175 .013121 -0.05 0.959 .9739289 1.025368

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

sp48\_28\_c\_lag\_all | 1.190163 .125826 1.65 0.100 .9674219 1.464188

sp48\_8\_c\_lag\_all | 1.022865 .066936 0.35 0.730 .8997375 1.162842

sp75\_1318\_c\_lag\_all | .9143442 .1142875 -0.72 0.474 .715673 1.168167

sp75\_1403\_8\_c\_lag\_all | 1.09248 .1065342 0.91 0.364 .9024183 1.322572

sp75\_208\_c\_lag\_all | .9640518 .0129242 -2.73 0.006 .9390507 .9897186

sp75\_388\_c\_lag\_all | 1.008413 .0407693 0.21 0.836 .9315901 1.09157

sp75\_209\_c\_lag\_all | 1.044312 .0384718 1.18 0.239 .9715663 1.122504

sp75\_389\_c\_lag\_all | 1.083182 .159898 0.54 0.588 .8110506 1.446621

sp75\_509\_c\_lag\_all | 1.368876 .1661166 2.59 0.010 1.079117 1.736439

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

sp75\_1400\_c\_lag\_all | .926669 .1136917 -0.62 0.535 .7286046 1.178575

sp75\_1403\_10\_c\_lag\_all | .9987056 .0244945 -0.05 0.958 .9518329 1.047886

sp75\_160\_c\_lag\_all | 1.986534 .5899142 2.31 0.021 1.110008 3.555215

sp75\_1720\_c\_lag\_all | 1.066775 .0343224 2.01 0.045 1.001582 1.136212

sp75\_340\_c\_lag\_all | 1.045823 .0181475 2.58 0.010 1.010853 1.082003

sp75\_500\_c\_lag\_all | 1.018103 .057109 0.32 0.749 .912105 1.136419

sp75\_510\_c\_lag\_all | 1 (omitted)

sp75\_810\_c\_lag\_all | .957047 .0158209 -2.66 0.008 .9265355 .9885632

mine\_time | .9987762 .0215493 -0.06 0.955 .957421 1.041918

onsite\_insp\_hours | 1.003761 .0004354 8.65 0.000 1.002907 1.004614

|

state |

1 | 1.043679 .8479651 0.05 0.958 .2123172 5.130369

2 | .8042731 .1183044 -1.48 0.139 .6028319 1.073028

3 | 1.234605 .5981476 0.44 0.664 .4776764 3.190968

4 | 5.062509 3.683927 2.23 0.026 1.216065 21.07536

5 | 1.147027 .6370093 0.25 0.805 .3862361 3.406389

6 | .5245283 .07715 -4.39 0.000 .393161 .6997896

7 | 3.587696 6.704446 0.68 0.494 .0920762 139.7926

8 | .8479019 .1167711 -1.20 0.231 .6473216 1.110634

9 | .1355208 .0674946 -4.01 0.000 .0510593 .3596976

10 | .5905315 .2415808 -1.29 0.198 .2648651 1.316623

11 | 2.502951 2.605055 0.88 0.378 .3254823 19.24763

12 | .5286075 .1194349 -2.82 0.005 .3394773 .8231063

13 | 2.013941 1.358325 1.04 0.299 .5369631 7.553514

14 | .4998317 .2045531 -1.69 0.090 .224117 1.114738

15 | .6782568 .1268712 -2.08 0.038 .470081 .9786233

17 | 1 (empty)

|

time |

2000 | .982761 .1876972 -0.09 0.927 .6758919 1.428955

2002 | .6612845 .1283604 -2.13 0.033 .4520262 .9674156

2003 | .8590875 .1962892 -0.66 0.506 .5489719 1.344388

2004 | .5216053 .1166015 -2.91 0.004 .3365592 .808393

2005 | .4747386 .1015212 -3.48 0.000 .3121966 .7219066

2006 | .5052913 .1100773 -3.13 0.002 .329692 .7744178

2007 | .3214906 .0718354 -5.08 0.000 .2074778 .4981553

2008 | .2328185 .0523475 -6.48 0.000 .1498411 .3617461

2009 | .2746496 .0716533 -4.95 0.000 .1647059 .4579825

2010 | .1988623 .0516904 -6.21 0.000 .1194811 .3309833

2011 | .2447798 .0627417 -5.49 0.000 .1481141 .4045338

2012 | .1676414 .0426366 -7.02 0.000 .1018341 .2759746

2013 | .2354301 .0687176 -4.96 0.000 .1328656 .4171686

2014 | .1547405 .0470366 -6.14 0.000 .0852832 .2807661

2015 | .0962426 .032239 -6.99 0.000 .0499155 .1855666

|

\_cons | .0001279 .0000237 -48.36 0.000 .0000889 .0001839

lnhours | 1 (offset)

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

Note: 0 failures and 62 successes completely determined.

(est1 stored)

**. lfit**

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

number of observations = 5614

number of covariate patterns = 5599

Pearson chi2(5494) = 8023.12

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -2703.8673

Iteration 1: log likelihood = -1921.0574

Iteration 2: log likelihood = -1648.1904

Iteration 3: log likelihood = -1632.7392

Iteration 4: log likelihood = -1632.1351

Iteration 5: log likelihood = -1632.1332

Iteration 6: log likelihood = -1632.1332

Logistic regression Number of obs = 5,614

LR chi2(2) = 2143.47

Prob > chi2 = 0.0000

Log likelihood = -1632.1332 Pseudo R2 = 0.3964

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

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

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

\_hat | .9856784 .0421305 23.40 0.000 .9031042 1.068253

\_hatsq | .0571317 .0175325 3.26 0.001 .0227688 .0914947

\_cons | -.1185954 .0558429 -2.12 0.034 -.2280455 -.0091453

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

Note: 0 failures and 206 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4383 559 | 4942

- | 182 490 | 672

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

Total | 4565 1049 | 5614

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

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

Sensitivity Pr( +| D) 96.01%

Specificity Pr( -|~D) 46.71%

Positive predictive value Pr( D| +) 88.69%

Negative predictive value Pr(~D| -) 72.92%

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

False + rate for true ~D Pr( +|~D) 53.29%

False - rate for true D Pr( -| D) 3.99%

False + rate for classified + Pr(~D| +) 11.31%

False - rate for classified - Pr( D| -) 27.08%

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

Correctly classified 86.80%

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

**. summ dv\_indicator bv4\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bv4\_yhat | 5,614 .8131457 .2384614 .0022217 1