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

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

note: sp48\_24\_pp\_1lag != 0 predicts success perfectly

sp48\_24\_pp\_1lag dropped and 1 obs not used

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

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

note: sp75\_100\_pp\_1lag != 0 predicts success perfectly

sp75\_100\_pp\_1lag dropped and 28 obs not used

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

sp75\_1003\_pp\_1lag dropped and 108 obs not used

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

sp75\_1003\_2\_pp\_1lag dropped and 5 obs not used

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

sp75\_1400\_1\_pp\_1lag dropped and 6 obs not used

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

sp75\_1405\_pp\_1lag dropped and 225 obs not used

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

sp75\_1405\_1\_pp\_1lag dropped and 3 obs not used

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

sp75\_153\_pp\_1lag dropped and 5 obs not used

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

sp75\_156\_pp\_1lag dropped and 5 obs not used

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

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

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

sp75\_343\_pp\_1lag dropped and 15 obs not used

note: sp75\_500\_1\_pp\_1lag != 0 predicts success perfectly

sp75\_500\_1\_pp\_1lag dropped and 3 obs not used

note: sp75\_508\_1\_pp\_1lag != 0 predicts success perfectly

sp75\_508\_1\_pp\_1lag dropped and 3 obs not used

note: sp75\_509\_pp\_1lag != 0 predicts success perfectly

sp75\_509\_pp\_1lag dropped and 31 obs not used

note: sp75\_512\_1\_pp\_1lag != 0 predicts success perfectly

sp75\_512\_1\_pp\_1lag dropped and 6 obs not used

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

sp75\_524\_pp\_1lag dropped and 9 obs not used

note: sp75\_703\_4\_pp\_1lag != 0 predicts success perfectly

sp75\_703\_4\_pp\_1lag dropped and 1 obs not used

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

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

note: 17.state != 0 predicts success perfectly

17.state dropped and 11 obs not used

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

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

note: sp75\_510\_pp\_1lag omitted because of collinearity

Iteration 0: log pseudolikelihood = -1936.3703

Iteration 1: log pseudolikelihood = -1722.1295

Iteration 2: log pseudolikelihood = -1681.5393

Iteration 3: log pseudolikelihood = -1677.1596

Iteration 4: log pseudolikelihood = -1676.7397

Iteration 5: log pseudolikelihood = -1676.7237

Iteration 6: log pseudolikelihood = -1676.7237

Logistic regression Number of obs = 5,779

Wald chi2(95) = .

Log pseudolikelihood = -1676.7237 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\_pp\_1lag | 1.01294 .0085322 1.53 0.127 .9963541 1.029801

sp48\_24\_pp\_1lag | 1 (omitted)

sp48\_25\_pp\_1lag | .9967743 .0086908 -0.37 0.711 .9798854 1.013954

sp48\_26\_pp\_1lag | 1.00419 .0034961 1.20 0.230 .9973606 1.011065

sp48\_27\_pp\_1lag | .9940363 .0088581 -0.67 0.502 .9768255 1.01155

sp48\_28\_pp\_1lag | 1.024021 .0173357 1.40 0.161 .9906011 1.058568

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

sp48\_5\_pp\_1lag | .9965544 .0064832 -0.53 0.596 .9839283 1.009342

sp48\_6\_pp\_1lag | .996746 .003902 -0.83 0.405 .9891275 1.004423

sp48\_7\_pp\_1lag | 1.000368 .0044335 0.08 0.934 .9917159 1.009095

sp48\_8\_pp\_1lag | .9994828 .0068254 -0.08 0.940 .9861943 1.01295

sp75\_100\_pp\_1lag | 1 (omitted)

sp75\_1002\_pp\_1lag | 1.000727 .0031445 0.23 0.817 .9945831 1.006909

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

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

sp75\_1311\_pp\_1lag | .9821923 .0083735 -2.11 0.035 .9659169 .9987419

sp75\_1315\_pp\_1lag | .9870258 .0296339 -0.43 0.664 .9306203 1.04685

sp75\_1316\_pp\_1lag | .9735151 .0102603 -2.55 0.011 .9536115 .9938341

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

sp75\_1400\_pp\_1lag | 1.002022 .0123981 0.16 0.870 .9780141 1.026618

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

sp75\_1403\_10\_pp\_1lag | 1.017424 .0063909 2.75 0.006 1.004975 1.030028

sp75\_1403\_5\_pp\_1lag | 1.003029 .0039239 0.77 0.439 .9953675 1.010749

sp75\_1403\_6\_pp\_1lag | 1.000893 .0033037 0.27 0.787 .9944385 1.007389

sp75\_1403\_7\_pp\_1lag | .98902 .0074887 -1.46 0.145 .9744508 1.003807

sp75\_1403\_8\_pp\_1lag | 1.032756 .0338278 0.98 0.325 .9685382 1.101232

sp75\_1404\_pp\_1lag | .9456994 .0172134 -3.07 0.002 .9125566 .980046

sp75\_1404\_1\_pp\_1lag | .9048986 .0198346 -4.56 0.000 .8668467 .944621

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

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

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

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

sp75\_160\_pp\_1lag | 1.015048 .0124142 1.22 0.222 .9910055 1.039673

sp75\_1719\_2\_pp\_1lag | .9742975 .0105881 -2.40 0.017 .9537647 .9952723

sp75\_1719\_4\_pp\_1lag | .9960963 .0033748 -1.15 0.248 .9895038 1.002733

sp75\_1720\_pp\_1lag | .9998671 .0028329 -0.05 0.963 .99433 1.005435

sp75\_1725\_pp\_1lag | 1.000933 .0006657 1.40 0.161 .9996295 1.002239

sp75\_1906\_pp\_1lag | .9914462 .0089206 -0.95 0.340 .9741153 1.009085

sp75\_1916\_pp\_1lag | .9739709 .0134329 -1.91 0.056 .9479956 1.000658

sp75\_203\_pp\_1lag | 1.000169 .0009316 0.18 0.856 .9983445 1.001996

sp75\_204\_pp\_1lag | 1.002446 .0016728 1.46 0.143 .9991731 1.00573

sp75\_205\_pp\_1lag | 1.006618 .018818 0.35 0.724 .970403 1.044185

sp75\_207\_pp\_1lag | 1.001512 .0122197 0.12 0.901 .9778459 1.025751

sp75\_208\_pp\_1lag | .9950317 .0014605 -3.39 0.001 .9921733 .9978983

sp75\_209\_pp\_1lag | 1.001749 .0032606 0.54 0.591 .9953786 1.00816

sp75\_212\_pp\_1lag | 1.047702 .0188611 2.59 0.010 1.01138 1.085329

sp75\_213\_pp\_1lag | 1.018305 .0560977 0.33 0.742 .9140832 1.13441

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

sp75\_332\_pp\_1lag | .9916153 .0083335 -1.00 0.316 .9754158 1.008084

sp75\_334\_pp\_1lag | .999132 .0037863 -0.23 0.819 .9917386 1.006581

sp75\_337\_pp\_1lag | 1.001872 .0039826 0.47 0.638 .9940965 1.009708

sp75\_340\_pp\_1lag | 1.006863 .0027085 2.54 0.011 1.001569 1.012186

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

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

sp75\_388\_pp\_1lag | .9974701 .0030603 -0.83 0.409 .9914901 1.003486

sp75\_389\_pp\_1lag | 1.003204 .015061 0.21 0.831 .9741151 1.033162

sp75\_500\_pp\_1lag | 1.002647 .0057247 0.46 0.643 .9914892 1.01393

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

sp75\_501\_pp\_1lag | 1.001892 .0090388 0.21 0.834 .9843323 1.019765

sp75\_501\_2\_pp\_1lag | 1.006595 .0091901 0.72 0.472 .9887429 1.024769

sp75\_502\_pp\_1lag | .9916463 .0158297 -0.53 0.599 .961101 1.023162

sp75\_503\_pp\_1lag | .9992774 .0003238 -2.23 0.026 .9986429 .9999123

sp75\_505\_pp\_1lag | 1.017066 .0212078 0.81 0.417 .9763372 1.059493

sp75\_506\_1\_pp\_1lag | 1.010912 .0253169 0.43 0.665 .9624899 1.06177

sp75\_507\_pp\_1lag | 1.001749 .0065787 0.27 0.790 .9889374 1.014726

sp75\_507\_1\_pp\_1lag | 1.003932 .0027212 1.45 0.148 .9986123 1.009279

sp75\_508\_1\_pp\_1lag | 1 (omitted)

sp75\_509\_pp\_1lag | 1 (omitted)

sp75\_510\_pp\_1lag | 1 (omitted)

sp75\_512\_1\_pp\_1lag | 1 (omitted)

sp75\_523\_pp\_1lag | .9968746 .0023144 -1.35 0.178 .9923489 1.001421

sp75\_523\_3\_pp\_1lag | .9988318 .0007701 -1.52 0.130 .9973235 1.000342

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

sp75\_602\_pp\_1lag | .9964413 .00447 -0.79 0.427 .9877186 1.005241

sp75\_603\_pp\_1lag | .9947514 .0049585 -1.06 0.291 .9850802 1.004518

sp75\_604\_pp\_1lag | 1.001003 .0006897 1.45 0.146 .999652 1.002356

sp75\_605\_pp\_1lag | 1.00169 .002134 0.79 0.428 .9975161 1.005881

sp75\_606\_pp\_1lag | .9978892 .0010991 -1.92 0.055 .9957373 1.000046

sp75\_607\_pp\_1lag | 1.002967 .0041338 0.72 0.472 .994898 1.011102

sp75\_703\_3\_pp\_1lag | 1.0175 .0148724 1.19 0.235 .9887642 1.047071

sp75\_703\_4\_pp\_1lag | 1 (omitted)

sp75\_807\_pp\_1lag | 1.001929 .0013411 1.44 0.150 .9993038 1.004561

sp75\_810\_pp\_1lag | .9951079 .0032842 -1.49 0.137 .9886918 1.001566

sp75\_811\_pp\_1lag | 1.005036 .005512 0.92 0.360 .9942909 1.015898

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

sp75\_816\_pp\_1lag | .9973312 .0028709 -0.93 0.353 .9917201 1.002974

sp75\_817\_pp\_1lag | .9618213 .0148582 -2.52 0.012 .9331363 .9913881

sp75\_906\_pp\_1lag | .9886965 .009886 -1.14 0.256 .9695089 1.008264

mine\_time | 1.007852 .0203614 0.39 0.699 .9687242 1.04856

onsite\_insp\_hours | 1.003969 .0004583 8.68 0.000 1.003071 1.004868

|

state |

1 | 1.126103 .9212094 0.15 0.885 .2265957 5.596343

2 | .5433355 .0927651 -3.57 0.000 .3888125 .7592696

3 | 1.318305 .5635477 0.65 0.518 .5703553 3.0471

4 | 4.672261 3.558171 2.02 0.043 1.050249 20.78556

5 | .9504888 .505779 -0.10 0.924 .3349664 2.697073

6 | .5110428 .0737197 -4.65 0.000 .3851842 .6780255

7 | 2.030282 2.504272 0.57 0.566 .1809812 22.7761

8 | .8658194 .1524089 -0.82 0.413 .613185 1.22254

9 | .2043072 .0320109 -10.14 0.000 .1502856 .2777474

10 | .6516656 .264273 -1.06 0.291 .294329 1.442835

11 | 3.067805 2.596724 1.32 0.185 .5838938 16.11839

12 | .50806 .1101392 -3.12 0.002 .3321914 .777037

13 | 1.988506 1.26354 1.08 0.279 .5723406 6.908743

14 | .4333502 .1867354 -1.94 0.052 .1862288 1.008396

15 | .6644022 .1157582 -2.35 0.019 .4722011 .9348353

17 | 1 (empty)

|

time |

2000 | .9880881 .1897207 -0.06 0.950 .6782008 1.439571

2002 | .6697624 .1310582 -2.05 0.041 .4564139 .9828397

2003 | .8905527 .2072381 -0.50 0.618 .5643894 1.405207

2004 | .5158055 .1115383 -3.06 0.002 .3376146 .7880444

2005 | .4661318 .0985399 -3.61 0.000 .3080104 .705427

2006 | .4880363 .1052789 -3.33 0.001 .3197655 .7448567

2007 | .3410542 .0769449 -4.77 0.000 .2191719 .5307159

2008 | .2548953 .0612426 -5.69 0.000 .1591648 .4082032

2009 | .2959553 .077786 -4.63 0.000 .1768091 .4953903

2010 | .197488 .0517384 -6.19 0.000 .1181791 .3300203

2011 | .2650148 .068992 -5.10 0.000 .1591016 .4414339

2012 | .1787737 .0455559 -6.76 0.000 .1084918 .2945849

2013 | .2478729 .0736859 -4.69 0.000 .1384172 .4438827

2014 | .1536404 .0456333 -6.31 0.000 .0858394 .2749944

2015 | .1086034 .0350467 -6.88 0.000 .0576976 .2044226

|

\_cons | .0001263 .0000231 -49.18 0.000 .0000883 .0001806

lnhours | 1 (offset)

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

Note: 0 failures and 46 successes completely determined.

(est1 stored)

**. lfit**

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

number of observations = 5779

number of covariate patterns = 5764

Pearson chi2(5665) = 4552.10

Prob > chi2 = 1.0000

**. linktest**

Iteration 0: log likelihood = -2737.4514

Iteration 1: log likelihood = -1925.7411

Iteration 2: log likelihood = -1695.1052

Iteration 3: log likelihood = -1666.9034

Iteration 4: log likelihood = -1664.9598

Iteration 5: log likelihood = -1664.944

Iteration 6: log likelihood = -1664.944

Logistic regression Number of obs = 5,779

LR chi2(2) = 2145.01

Prob > chi2 = 0.0000

Log likelihood = -1664.944 Pseudo R2 = 0.3918

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

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

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

\_hat | .9634028 .0399041 24.14 0.000 .8851922 1.041613

\_hatsq | .0763535 .0173126 4.41 0.000 .0424214 .1102855

\_cons | -.1457142 .056788 -2.57 0.010 -.2570166 -.0344119

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

Note: 0 failures and 243 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4562 571 | 5133

- | 168 478 | 646

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

Total | 4730 1049 | 5779

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

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

Sensitivity Pr( +| D) 96.45%

Specificity Pr( -|~D) 45.57%

Positive predictive value Pr( D| +) 88.88%

Negative predictive value Pr(~D| -) 73.99%

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

False + rate for true ~D Pr( +|~D) 54.43%

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

False + rate for classified + Pr(~D| +) 11.12%

False - rate for classified - Pr( D| -) 26.01%

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

Correctly classified 87.21%

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

**. summ dv\_indicator bpp2\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bpp2\_yhat | 5,779 .8184807 .2336067 .0023347 1