// Model PS.Y.B.SP.PP.1

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

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

sp48\_24\_pp dropped and 1 obs not used

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

sp48\_4\_pp dropped and 1 obs not used

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

sp75\_1003\_pp dropped and 109 obs not used

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

sp75\_1003\_2\_pp dropped and 4 obs not used

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

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

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

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

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

sp75\_153\_pp dropped and 5 obs not used

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

sp75\_156\_pp dropped and 5 obs not used

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

sp75\_215\_pp dropped and 3 obs not used

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

sp75\_343\_pp dropped and 22 obs not used

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

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

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

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

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

sp75\_509\_pp dropped and 35 obs not used

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

sp75\_512\_1\_pp dropped and 7 obs not used

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

sp75\_524\_pp dropped and 7 obs not used

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

sp75\_812\_pp dropped and 11 obs not used

note: 17.state != 0 predicts success perfectly

17.state dropped and 11 obs not used

note: sp75\_1318\_pp omitted because of collinearity

note: sp75\_373\_pp omitted because of collinearity

note: sp75\_510\_pp omitted because of collinearity

Iteration 0: log pseudolikelihood = -1956.5183

Iteration 1: log pseudolikelihood = -1734.7867

Iteration 2: log pseudolikelihood = -1690.5916

Iteration 3: log pseudolikelihood = -1685.8271

Iteration 4: log pseudolikelihood = -1685.1534

Iteration 5: log pseudolikelihood = -1685.0419

Iteration 6: log pseudolikelihood = -1685.0405

Iteration 7: log pseudolikelihood = -1685.0405

Logistic regression Number of obs = 6,017

Wald chi2(98) = .

Log pseudolikelihood = -1685.0405 Prob > chi2 = .

(Std. Err. adjusted for 1,237 clusters in mineid)

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

| Robust

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

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

sp48\_11\_pp | 1.023924 .0128892 1.88 0.060 .9989708 1.049501

sp48\_24\_pp | 1 (omitted)

sp48\_25\_pp | .9985142 .0076424 -0.19 0.846 .9836471 1.013606

sp48\_26\_pp | 1.001591 .0034748 0.46 0.647 .9948035 1.008425

sp48\_27\_pp | .9925313 .0062681 -1.19 0.235 .9803217 1.004893

sp48\_28\_pp | 1.021081 .0140796 1.51 0.130 .9938548 1.049053

sp48\_4\_pp | 1 (omitted)

sp48\_5\_pp | .9932872 .007397 -0.90 0.366 .9788946 1.007892

sp48\_6\_pp | .9970156 .0036131 -0.82 0.409 .9899592 1.004122

sp48\_7\_pp | 1.011351 .0051161 2.23 0.026 1.001373 1.021429

sp48\_8\_pp | 1.000729 .0071316 0.10 0.919 .9868487 1.014805

sp75\_100\_pp | 1.012805 .0257943 0.50 0.617 .9634903 1.064644

sp75\_1002\_pp | .9992598 .0033384 -0.22 0.825 .9927381 1.005824

sp75\_1003\_pp | 1 (omitted)

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

sp75\_1311\_pp | .9807788 .00951 -2.00 0.045 .9623155 .9995963

sp75\_1315\_pp | .9842446 .0283575 -0.55 0.581 .930205 1.041424

sp75\_1316\_pp | .9874011 .0131694 -0.95 0.342 .961924 1.013553

sp75\_1318\_pp | 1 (omitted)

sp75\_1400\_pp | .9978008 .0109548 -0.20 0.841 .9765592 1.019504

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

sp75\_1403\_10\_pp | 1.011602 .0051332 2.27 0.023 1.001591 1.021713

sp75\_1403\_5\_pp | 1.002377 .0028209 0.84 0.399 .9968636 1.007921

sp75\_1403\_6\_pp | 1.003987 .0040536 0.99 0.324 .9960732 1.011963

sp75\_1403\_7\_pp | .9947947 .0069114 -0.75 0.453 .9813405 1.008433

sp75\_1403\_8\_pp | 1.034992 .0319965 1.11 0.266 .9741419 1.099643

sp75\_1404\_pp | .9444718 .0143753 -3.75 0.000 .9167128 .9730713

sp75\_1404\_1\_pp | .9545662 .0187263 -2.37 0.018 .9185599 .9919839

sp75\_1405\_pp | 1.005148 .0077918 0.66 0.508 .9899916 1.020536

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

sp75\_153\_pp | 1 (omitted)

sp75\_156\_pp | 1 (omitted)

sp75\_160\_pp | 1.009805 .0152216 0.65 0.517 .9804073 1.040084

sp75\_1719\_2\_pp | .9826704 .0130437 -1.32 0.188 .9574349 1.008571

sp75\_1719\_4\_pp | .9986383 .0034994 -0.39 0.697 .9918032 1.005521

sp75\_1720\_pp | .9999936 .0025442 -0.00 0.998 .9950194 1.004993

sp75\_1725\_pp | 1.000505 .0005631 0.90 0.369 .9994024 1.00161

sp75\_1906\_pp | .9920014 .0081583 -0.98 0.329 .9761396 1.008121

sp75\_1916\_pp | .9749418 .0135504 -1.83 0.068 .9487419 1.001865

sp75\_203\_pp | 1.00103 .0009285 1.11 0.267 .9992121 1.002852

sp75\_204\_pp | 1.001823 .0016637 1.10 0.273 .9985675 1.005089

sp75\_205\_pp | 1.031439 .0304562 1.05 0.294 .9734408 1.092893

sp75\_207\_pp | .9923114 .0096395 -0.79 0.427 .9735971 1.011385

sp75\_208\_pp | .9955921 .001313 -3.35 0.001 .9930219 .9981689

sp75\_209\_pp | 1.001463 .0033584 0.44 0.663 .9949027 1.008067

sp75\_212\_pp | 1.013966 .0149979 0.94 0.348 .9849926 1.043791

sp75\_213\_pp | 1.014949 .0364708 0.41 0.680 .9459268 1.089008

sp75\_215\_pp | 1 (omitted)

sp75\_332\_pp | .9860772 .0071165 -1.94 0.052 .9722274 1.000124

sp75\_334\_pp | .997974 .0042192 -0.48 0.631 .9897387 1.006278

sp75\_337\_pp | 1.003009 .0039645 0.76 0.447 .9952687 1.010809

sp75\_340\_pp | 1.005298 .0026096 2.04 0.042 1.000196 1.010426

sp75\_343\_pp | 1 (omitted)

sp75\_373\_pp | 1 (omitted)

sp75\_388\_pp | .998761 .0029065 -0.43 0.670 .9930806 1.004474

sp75\_389\_pp | .9995604 .0146527 -0.03 0.976 .9712503 1.028696

sp75\_500\_pp | .998135 .0042688 -0.44 0.662 .9898032 1.006537

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

sp75\_501\_pp | 1.006581 .0099707 0.66 0.508 .9872277 1.026314

sp75\_501\_2\_pp | 1.001571 .0080627 0.19 0.845 .9858923 1.017499

sp75\_502\_pp | 1.000612 .0137656 0.04 0.965 .9739922 1.027959

sp75\_503\_pp | .9991588 .0002857 -2.94 0.003 .998599 .9997189

sp75\_505\_pp | 1.005863 .0149189 0.39 0.693 .9770431 1.035532

sp75\_506\_1\_pp | 1.001784 .0155046 0.12 0.908 .9718514 1.032638

sp75\_507\_pp | 1.007889 .0084641 0.94 0.349 .9914357 1.024616

sp75\_507\_1\_pp | 1.00275 .0028986 0.95 0.342 .9970847 1.008447

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

sp75\_509\_pp | 1 (omitted)

sp75\_510\_pp | 1 (omitted)

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

sp75\_523\_pp | .9957074 .0021859 -1.96 0.050 .9914324 1.000001

sp75\_523\_3\_pp | .9984139 .0007522 -2.11 0.035 .9969406 .9998893

sp75\_524\_pp | 1 (omitted)

sp75\_602\_pp | .9988989 .0040968 -0.27 0.788 .9909015 1.006961

sp75\_603\_pp | .9984837 .0072972 -0.21 0.836 .9842833 1.012889

sp75\_604\_pp | 1.001281 .0006936 1.85 0.064 .9999231 1.002642

sp75\_605\_pp | 1.001796 .0021662 0.83 0.407 .9975596 1.006051

sp75\_606\_pp | .9988884 .001089 -1.02 0.308 .9967562 1.001025

sp75\_607\_pp | 1.005402 .0049505 1.09 0.274 .9957454 1.015151

sp75\_703\_3\_pp | 1.006628 .0149061 0.45 0.656 .9778321 1.036271

sp75\_703\_4\_pp | .9753576 .0286535 -0.85 0.396 .920784 1.033166

sp75\_807\_pp | 1.001512 .0011785 1.28 0.199 .999205 1.003825

sp75\_810\_pp | .9953208 .0028564 -1.63 0.102 .9897381 1.000935

sp75\_811\_pp | 1.005816 .0059476 0.98 0.327 .9942266 1.017541

sp75\_812\_pp | 1 (omitted)

sp75\_816\_pp | .9958821 .0028461 -1.44 0.149 .9903195 1.001476

sp75\_817\_pp | .9678276 .0157708 -2.01 0.045 .9374058 .9992367

sp75\_906\_pp | .9853817 .0117356 -1.24 0.216 .9626468 1.008654

mine\_time | 1.010524 .0206078 0.51 0.608 .9709301 1.051733

onsite\_insp\_hours | 1.004096 .0004767 8.61 0.000 1.003162 1.005031

|

state |

1 | 1.223206 .9910768 0.25 0.804 .2499376 5.986426

2 | .5674436 .0968388 -3.32 0.001 .4061237 .7928427

3 | 1.152053 .4960222 0.33 0.742 .4954311 2.678931

4 | 4.818276 3.534223 2.14 0.032 1.14428 20.28855

5 | .8735802 .4542804 -0.26 0.795 .3152534 2.420727

6 | .5006063 .0725893 -4.77 0.000 .3767643 .6651552

7 | 1.889034 2.148954 0.56 0.576 .2031971 17.56151

8 | .8334537 .2444474 -0.62 0.535 .4690603 1.480929

9 | .1998088 .030721 -10.47 0.000 .1478226 .2700776

10 | .6749693 .2764114 -0.96 0.337 .3024841 1.506141

11 | 2.912864 2.641299 1.18 0.238 .4925791 17.22521

12 | .4973131 .1082443 -3.21 0.001 .3246077 .7619053

13 | 1.888027 1.214947 0.99 0.323 .5348837 6.664337

14 | .4358974 .1797095 -2.01 0.044 .1942922 .9779422

15 | .6597536 .1135147 -2.42 0.016 .4708984 .9243497

17 | 1 (empty)

|

time |

2000 | 1.026185 .1965727 0.13 0.893 .7049724 1.493754

2002 | .6684495 .1310118 -2.06 0.040 .4552381 .9815188

2003 | .8856277 .2040151 -0.53 0.598 .5638539 1.391028

2004 | .5081972 .1104676 -3.11 0.002 .3318985 .7781429

2005 | .4597647 .0974202 -3.67 0.000 .3035103 .6964627

2006 | .4793144 .1036513 -3.40 0.001 .3137248 .732305

2007 | .3588353 .0819685 -4.49 0.000 .2293272 .5614804

2008 | .2725507 .0661307 -5.36 0.000 .1694005 .4385102

2009 | .2978286 .0777597 -4.64 0.000 .1785366 .4968275

2010 | .205338 .0538245 -6.04 0.000 .122842 .3432351

2011 | .2682021 .0697394 -5.06 0.000 .1611121 .4464741

2012 | .180438 .0457569 -6.75 0.000 .1097675 .2966077

2013 | .2507164 .0746961 -4.64 0.000 .1398247 .4495538

2014 | .1510303 .0451984 -6.32 0.000 .0840093 .2715192

2015 | .1048804 .0339983 -6.96 0.000 .0555606 .1979803

|

\_cons | .000126 .0000232 -48.87 0.000 .0000879 .0001807

lnhours | 1 (offset)

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

Note: 0 failures and 80 successes completely determined.

(est1 stored)

**. lfit**

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

number of observations = 6017

number of covariate patterns = 6001

Pearson chi2(5899) = 4693.82

Prob > chi2 = 1.0000

**. linktest**

Iteration 0: log likelihood = -2784.0693

Iteration 1: log likelihood = -2031.0649

Iteration 2: log likelihood = -2003.3646

Iteration 3: log likelihood = -1730.009

Iteration 4: log likelihood = -1684.5542

Iteration 5: log likelihood = -1675.703

Iteration 6: log likelihood = -1675.3133

Iteration 7: log likelihood = -1675.3127

Iteration 8: log likelihood = -1675.3127

Logistic regression Number of obs = 6,017

LR chi2(2) = 2217.51

Prob > chi2 = 0.0000

Log likelihood = -1675.3127 Pseudo R2 = 0.3983

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

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

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

\_hat | .9715263 .0411679 23.60 0.000 .8908387 1.052214

\_hatsq | .0668899 .017379 3.85 0.000 .0328277 .1009521

\_cons | -.1319573 .0563391 -2.34 0.019 -.2423799 -.0215348

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

Note: 0 failures and 298 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 4795 584 | 5379

- | 173 465 | 638

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

Total | 4968 1049 | 6017

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

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

Sensitivity Pr( +| D) 96.52%

Specificity Pr( -|~D) 44.33%

Positive predictive value Pr( D| +) 89.14%

Negative predictive value Pr(~D| -) 72.88%

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

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

False - rate for true D Pr( -| D) 3.48%

False + rate for classified + Pr(~D| +) 10.86%

False - rate for classified - Pr( D| -) 27.12%

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

Correctly classified 87.42%

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

**. summ dv\_indicator bpp1\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

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

bpp1\_yhat | 6,017 .8256606 .2307311 .0023651 1