. // Model PS.Q.B.SP.SSV.2

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

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

sp75\_1003\_2\_ss\_1lag dropped and 9 obs not used

note: sp75\_1318\_ss\_1lag != 0 predicts failure perfectly

sp75\_1318\_ss\_1lag dropped and 1 obs not used

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

sp75\_1400\_1\_ss\_1lag dropped and 5 obs not used

note: sp75\_1404\_ss\_1lag != 0 predicts success perfectly

sp75\_1404\_ss\_1lag dropped and 3 obs not used

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

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

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

sp75\_153\_ss\_1lag dropped and 1 obs not used

note: sp75\_155\_ss\_1lag != 0 predicts success perfectly

sp75\_155\_ss\_1lag dropped and 1 obs not used

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

sp75\_156\_ss\_1lag dropped and 1 obs not used

note: sp75\_1906\_ss\_1lag != 0 predicts success perfectly

sp75\_1906\_ss\_1lag dropped and 5 obs not used

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

sp75\_215\_ss\_1lag dropped and 3 obs not used

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

sp75\_343\_ss\_1lag dropped and 12 obs not used

note: sp75\_373\_ss\_1lag != 0 predicts failure perfectly

sp75\_373\_ss\_1lag dropped and 1 obs not used

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

sp75\_500\_1\_ss\_1lag dropped and 2 obs not used

note: sp75\_817\_ss\_1lag != 0 predicts success perfectly

sp75\_817\_ss\_1lag dropped and 4 obs not used

note: sp75\_1322\_ss\_1lag omitted because of collinearity

Iteration 0: log pseudolikelihood = -13377.022

Iteration 1: log pseudolikelihood = -12709.164

Iteration 2: log pseudolikelihood = -12670.898

Iteration 3: log pseudolikelihood = -12670.333

Iteration 4: log pseudolikelihood = -12670.33

Iteration 5: log pseudolikelihood = -12670.33

Logistic regression Number of obs = 26,059

Wald chi2(148) = .

Log pseudolikelihood = -12670.33 Prob > chi2 = .

(Std. Err. adjusted for 1,475 clusters in mineid)

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

| Robust

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

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

sp48\_11\_ss\_1lag | 1.238909 .3730432 0.71 0.477 .6866527 2.235329

sp48\_25\_ss\_1lag | 1.242864 .4640185 0.58 0.560 .5979035 2.583548

sp48\_26\_ss\_1lag | 1.119709 .261608 0.48 0.628 .708323 1.770025

sp48\_27\_ss\_1lag | .8819355 .2393727 -0.46 0.643 .5180908 1.501301

sp48\_28\_ss\_1lag | 1.179219 .4612817 0.42 0.673 .5478044 2.538422

sp48\_4\_ss\_1lag | .4238238 .5853979 -0.62 0.534 .0282801 6.351699

sp48\_5\_ss\_1lag | 1.965787 .7845194 1.69 0.090 .8991525 4.297735

sp48\_6\_ss\_1lag | .6013791 .1553733 -1.97 0.049 .3624353 .9978519

sp48\_7\_ss\_1lag | 1.329739 .3152012 1.20 0.229 .8355983 2.116095

sp48\_8\_ss\_1lag | 1.098809 .4530333 0.23 0.819 .4897523 2.465291

sp75\_100\_ss\_1lag | 3.097771 2.582038 1.36 0.175 .6047282 15.86859

sp75\_1002\_ss\_1lag | 1.461849 .701311 0.79 0.429 .5708802 3.743346

sp75\_1003\_ss\_1lag | 1.156124 .5995501 0.28 0.780 .4183914 3.194669

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

sp75\_1311\_ss\_1lag | .6272958 .3993153 -0.73 0.464 .1801466 2.184332

sp75\_1315\_ss\_1lag | 1.797349 1.280421 0.82 0.410 .4448783 7.261453

sp75\_1316\_ss\_1lag | .9011522 .9263687 -0.10 0.919 .1201649 6.758004

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

sp75\_1322\_ss\_1lag | 1 (omitted)

sp75\_1400\_ss\_1lag | 1.730279 .7430972 1.28 0.202 .7456817 4.014938

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

sp75\_1403\_10\_ss\_1lag | 1.477877 .3036154 1.90 0.057 .9880236 2.210596

sp75\_1403\_5\_ss\_1lag | 1.258572 .2034374 1.42 0.155 .9168296 1.727697

sp75\_1403\_6\_ss\_1lag | 1.121163 .1226469 1.05 0.296 .9048023 1.389261

sp75\_1403\_7\_ss\_1lag | 1.140476 .3570038 0.42 0.675 .6174958 2.106387

sp75\_1403\_8\_ss\_1lag | .8036316 .1187882 -1.48 0.139 .6015024 1.073684

sp75\_1404\_ss\_1lag | 1 (omitted)

sp75\_1404\_1\_ss\_1lag | 1.319065 .9334618 0.39 0.696 .3295316 5.280017

sp75\_1405\_ss\_1lag | 1.114417 .1936849 0.62 0.533 .7927009 1.5667

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

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

sp75\_155\_ss\_1lag | 1 (omitted)

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

sp75\_1719\_2\_ss\_1lag | .0676246 .0558697 -3.26 0.001 .0133926 .3414642

sp75\_1719\_4\_ss\_1lag | 1.301878 .5899096 0.58 0.560 .5356388 3.164233

sp75\_1720\_ss\_1lag | 1.045036 .1092998 0.42 0.674 .8513431 1.282797

sp75\_1725\_ss\_1lag | 1.03017 .0253879 1.21 0.228 .9815933 1.081151

sp75\_1906\_ss\_1lag | 1 (omitted)

sp75\_1916\_ss\_1lag | 2.048477 1.474506 1.00 0.319 .4997254 8.397131

sp75\_203\_ss\_1lag | 1.046874 .050102 0.96 0.338 .953141 1.149825

sp75\_204\_ss\_1lag | 1.244257 .1287461 2.11 0.035 1.015861 1.524003

sp75\_205\_ss\_1lag | 1.457517 .8593761 0.64 0.523 .4589141 4.629095

sp75\_207\_ss\_1lag | 2.740789 1.419324 1.95 0.052 .9932966 7.562618

sp75\_208\_ss\_1lag | .9153215 .0512661 -1.58 0.114 .8201605 1.021524

sp75\_209\_ss\_1lag | 1.016231 .1731802 0.09 0.925 .7276718 1.419218

sp75\_212\_ss\_1lag | .8584362 .1721936 -0.76 0.447 .5793829 1.271893

sp75\_213\_ss\_1lag | .4840184 .4765963 -0.74 0.461 .0702608 3.334346

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

sp75\_332\_ss\_1lag | .6158304 .2337778 -1.28 0.202 .2926396 1.295953

sp75\_334\_ss\_1lag | 1.062851 .2298068 0.28 0.778 .6957098 1.623742

sp75\_337\_ss\_1lag | 1.343872 .4384471 0.91 0.365 .7090025 2.547229

sp75\_340\_ss\_1lag | 1.197587 .1210742 1.78 0.075 .9823171 1.460031

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

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

sp75\_388\_ss\_1lag | 1.05024 .1604503 0.32 0.748 .7784781 1.416873

sp75\_389\_ss\_1lag | .7769256 .4428216 -0.44 0.658 .2542278 2.374301

sp75\_500\_ss\_1lag | 1.999851 .8201171 1.69 0.091 .8952183 4.467516

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

sp75\_501\_ss\_1lag | .6489579 .4187249 -0.67 0.503 .1832309 2.298446

sp75\_501\_2\_ss\_1lag | .3320557 .2168887 -1.69 0.091 .0923064 1.194511

sp75\_502\_ss\_1lag | .2317842 .3080506 -1.10 0.271 .0171318 3.135922

sp75\_503\_ss\_1lag | 1.049434 .0336325 1.51 0.132 .985543 1.117467

sp75\_505\_ss\_1lag | .787241 .5227459 -0.36 0.719 .214235 2.892843

sp75\_506\_1\_ss\_1lag | .879721 .8768494 -0.13 0.898 .1247159 6.205374

sp75\_507\_ss\_1lag | 2.308775 .7542375 2.56 0.010 1.21705 4.379804

sp75\_507\_1\_ss\_1lag | .977526 .3175919 -0.07 0.944 .5171047 1.847899

sp75\_509\_ss\_1lag | .664803 .26231 -1.03 0.301 .3067864 1.440622

sp75\_512\_1\_ss\_1lag | 1.668574 1.3864 0.62 0.538 .3274095 8.503537

sp75\_523\_ss\_1lag | .8665445 .0734023 -1.69 0.091 .7339868 1.023042

sp75\_523\_3\_ss\_1lag | 1.026347 .0422681 0.63 0.528 .9467584 1.112626

sp75\_524\_ss\_1lag | .4682252 .2972194 -1.20 0.232 .1349367 1.624723

sp75\_602\_ss\_1lag | 1.383968 .3745536 1.20 0.230 .8142525 2.352302

sp75\_603\_ss\_1lag | 1.112852 .3053301 0.39 0.697 .6499734 1.905369

sp75\_604\_ss\_1lag | 1.049671 .0306071 1.66 0.096 .9913645 1.111407

sp75\_605\_ss\_1lag | 1.037751 .1092974 0.35 0.725 .8441959 1.275683

sp75\_606\_ss\_1lag | 1.017993 .056619 0.32 0.748 .9128565 1.135239

sp75\_607\_ss\_1lag | 1.197588 .2659896 0.81 0.417 .7749109 1.850815

sp75\_703\_3\_ss\_1lag | 2.678638 1.661518 1.59 0.112 .7941942 9.034441

sp75\_807\_ss\_1lag | 1.122011 .1011528 1.28 0.202 .940283 1.338861

sp75\_810\_ss\_1lag | 1.088481 .3142564 0.29 0.769 .6181154 1.916779

sp75\_811\_ss\_1lag | .5117648 .1746545 -1.96 0.050 .2621641 .9990047

sp75\_812\_ss\_1lag | .6773451 .5523855 -0.48 0.633 .1369752 3.349486

sp75\_816\_ss\_1lag | .9706586 .2790919 -0.10 0.918 .5524868 1.705341

sp75\_817\_ss\_1lag | 1 (omitted)

sp75\_906\_ss\_1lag | .5317209 .2655547 -1.26 0.206 .1997894 1.415126

mine\_time | 1.001982 .0023958 0.83 0.408 .9972977 1.006689

onsite\_insp\_hours | 1.004149 .0004394 9.46 0.000 1.003288 1.005011

|

state |

AL | 1.179954 .410208 0.48 0.634 .5969622 2.332293

AR | 2.205664 .1582957 11.02 0.000 1.916242 2.538799

CO | 1.74271 .3007806 3.22 0.001 1.242548 2.444202

IL | 3.649345 1.168255 4.04 0.000 1.948597 6.834516

IN | 1.5611 .3349614 2.08 0.038 1.025157 2.377229

MD | 1.722324 .3853225 2.43 0.015 1.110918 2.670224

MT | .4522798 .0302289 -11.87 0.000 .3967489 .5155831

NM | 2.530292 .149859 15.67 0.000 2.25298 2.841737

OH | 1.357179 .2729543 1.52 0.129 .9150493 2.012935

OK | 3.76016 1.596282 3.12 0.002 1.636252 8.640972

PA | 1.65007 .1814929 4.55 0.000 1.330081 2.047043

TN | 2.232069 .4435623 4.04 0.000 1.51201 3.295038

UT | .4662366 .1394466 -2.55 0.011 .2594304 .8378996

VA | 1.072868 .0803252 0.94 0.348 .92644 1.24244

WV | 1.708623 .1182122 7.74 0.000 1.491953 1.956758

WY | 2.225884 .3919091 4.54 0.000 1.576276 3.143205

|

time |

2000.25 | 1.385115 .2068111 2.18 0.029 1.033696 1.856002

2000.5 | 1.36343 .2085238 2.03 0.043 1.010298 1.839993

2000.75 | .7099408 .0979921 -2.48 0.013 .5416666 .930491

2001 | .8131591 .1174841 -1.43 0.152 .6126256 1.079334

2001.25 | .9565185 .1326368 -0.32 0.749 .7288874 1.255239

2001.75 | .8564537 .1171413 -1.13 0.257 .6550598 1.119765

2002 | .8444056 .1223754 -1.17 0.243 .6356101 1.12179

2002.25 | .6922509 .0996055 -2.56 0.011 .5221403 .9177827

2002.5 | 1.057672 .1607074 0.37 0.712 .7852634 1.424578

2002.75 | .6885356 .1014917 -2.53 0.011 .5157715 .9191693

2003 | .7276308 .1118802 -2.07 0.039 .5383078 .9835388

2003.25 | .7956717 .1263725 -1.44 0.150 .58283 1.08624

2003.5 | 1.224703 .2031891 1.22 0.222 .8847259 1.695324

2003.75 | .641857 .1003533 -2.84 0.005 .4724483 .8720115

2004 | .6623786 .1003269 -2.72 0.007 .4922428 .8913189

2004.25 | .5776754 .0880752 -3.60 0.000 .4284553 .7788649

2004.5 | .7061929 .107308 -2.29 0.022 .5243012 .9511868

2004.75 | .5111229 .0759684 -4.52 0.000 .3819538 .6839742

2005 | .5601948 .0857334 -3.79 0.000 .4150203 .7561514

2005.25 | .5748664 .0861952 -3.69 0.000 .4284876 .7712509

2005.5 | .6446114 .0963154 -2.94 0.003 .4809662 .8639355

2005.75 | .4272356 .0642619 -5.65 0.000 .3181526 .5737193

2006 | .5954824 .0924656 -3.34 0.001 .4392337 .8073135

2006.25 | .5386358 .082659 -4.03 0.000 .3987218 .7276465

2006.5 | .5985555 .0903785 -3.40 0.001 .4452232 .8046945

2006.75 | .5059089 .0801349 -4.30 0.000 .3708889 .6900822

2007 | .4314398 .0663039 -5.47 0.000 .3192326 .5830869

2007.25 | .4984279 .0773782 -4.49 0.000 .3676699 .6756887

2007.5 | .5620924 .089733 -3.61 0.000 .4110749 .7685893

2007.75 | .3975204 .0623382 -5.88 0.000 .2923318 .5405587

2008 | .4086769 .0655519 -5.58 0.000 .2984332 .5596457

2008.25 | .4063252 .0653337 -5.60 0.000 .2964884 .5568521

2008.5 | .3859655 .0605958 -6.06 0.000 .2837341 .5250316

2008.75 | .3621771 .0566981 -6.49 0.000 .2664815 .4922376

2009 | .4257858 .0694428 -5.24 0.000 .3092901 .5861603

2009.25 | .3806085 .0633526 -5.80 0.000 .27466 .5274261

2009.5 | .3867545 .064384 -5.71 0.000 .2790832 .5359659

2009.75 | .3244333 .0549514 -6.65 0.000 .2327833 .4521672

2010 | .3808979 .0651706 -5.64 0.000 .272377 .5326559

2010.25 | .3400462 .0577356 -6.35 0.000 .2437892 .4743089

2010.5 | .5047703 .0865909 -3.99 0.000 .3606404 .7065018

2010.75 | .3069682 .0522783 -6.93 0.000 .2198515 .4286052

2011 | .3431812 .0588521 -6.24 0.000 .2452173 .4802816

2011.25 | .3944312 .0686712 -5.34 0.000 .2803984 .5548391

2011.5 | .4881349 .0806338 -4.34 0.000 .3531279 .6747575

2011.75 | .3277886 .0548568 -6.66 0.000 .2361249 .4550363

2012 | .3403529 .0574929 -6.38 0.000 .2444236 .4739316

2012.25 | .3740328 .064157 -5.73 0.000 .2672421 .5234973

2012.5 | .3332049 .059945 -6.11 0.000 .2341944 .474074

2012.75 | .1725261 .0316481 -9.58 0.000 .1204234 .2471719

2013 | .2838844 .0524347 -6.82 0.000 .197661 .4077201

2013.25 | .2914497 .0534863 -6.72 0.000 .2034008 .4176136

2013.5 | .2966934 .0566685 -6.36 0.000 .2040461 .4314073

2013.75 | .2092919 .0411203 -7.96 0.000 .1424012 .3076034

2014 | .2223414 .0465647 -7.18 0.000 .1474872 .3351864

2014.25 | .2174788 .0428045 -7.75 0.000 .1478707 .3198539

2014.5 | .2545858 .0520841 -6.69 0.000 .1704874 .3801683

2014.75 | .2817133 .0572718 -6.23 0.000 .1891297 .419619

2015 | .2289825 .0459922 -7.34 0.000 .1544666 .3394456

2015.25 | .1895647 .0397742 -7.93 0.000 .1256491 .285993

2015.5 | .3209236 .0668798 -5.45 0.000 .2133108 .4828256

2015.75 | .2007901 .0432906 -7.45 0.000 .1315897 .3063815

2016 | .1306471 .0318723 -8.34 0.000 .0809921 .2107448

|

\_cons | .0000834 9.46e-06 -82.73 0.000 .0000667 .0001041

lnhours | 1 (offset)

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

(est1 stored)

**. lfit**

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

number of observations = 26059

number of covariate patterns = 25991

Pearson chi2(25839) = 74510.16

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -17518.116

Iteration 1: log likelihood = -12951.07

Iteration 2: log likelihood = -12464.947

Iteration 3: log likelihood = -12413.808

Iteration 4: log likelihood = -12413.705

Iteration 5: log likelihood = -12413.705

Logistic regression Number of obs = 26,059

LR chi2(2) = 10208.82

Prob > chi2 = 0.0000

Log likelihood = -12413.705 Pseudo R2 = 0.2914

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

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

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

\_hat | .9919116 .0142258 69.73 0.000 .9640296 1.019794

\_hatsq | .1288342 .0047647 27.04 0.000 .1194955 .1381729

\_cons | -.1628481 .0170894 -9.53 0.000 -.1963426 -.1293535

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

Note: 0 failures and 47 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 13205 3577 | 16782

- | 2479 6798 | 9277

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

Total | 15684 10375 | 26059

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

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

Sensitivity Pr( +| D) 84.19%

Specificity Pr( -|~D) 65.52%

Positive predictive value Pr( D| +) 78.69%

Negative predictive value Pr(~D| -) 73.28%

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

False + rate for true ~D Pr( +|~D) 34.48%

False - rate for true D Pr( -| D) 15.81%

False + rate for classified + Pr(~D| +) 21.31%

False - rate for classified - Pr( D| -) 26.72%

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

Correctly classified 76.76%

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

**. summ dv\_indicator bssv2\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

dv\_indicator | 30,289 .5522797 .4972675 0 1

bssv2\_yhat | 26,059 .601865 .2810586 .0003345 .9999986