. // Model PS.Q.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\_1404\_ss\_c\_lag\_all != 0 predicts success perfectly

sp75\_1404\_ss\_c\_lag\_all dropped and 49 obs not used

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

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

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

sp75\_1719\_2\_ss\_c\_lag\_all dropped and 48 obs not used

note: sp75\_373\_ss\_c\_lag\_all != 0 predicts failure perfectly

sp75\_373\_ss\_c\_lag\_all dropped and 2 obs not used

note: 8.state != 0 predicts failure perfectly

8.state dropped and 1 obs not used

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

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

Iteration 0: log pseudolikelihood = -9637.8278

Iteration 1: log pseudolikelihood = -9049.0926

Iteration 2: log pseudolikelihood = -9000.4304

Iteration 3: log pseudolikelihood = -8998.4278

Iteration 4: log pseudolikelihood = -8998.3946

Iteration 5: log pseudolikelihood = -8998.3945

Logistic regression Number of obs = 19,180

Wald chi2(155) = .

Log pseudolikelihood = -8998.3945 Prob > chi2 = .

(Std. Err. adjusted for 1,287 clusters in mineid)

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

| Robust

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

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

sp48\_11\_ss\_c\_lag\_all | 1.136377 .2036919 0.71 0.476 .7997377 1.614722

sp48\_25\_ss\_c\_lag\_all | 1.049274 .1118719 0.45 0.652 .8514034 1.293132

sp48\_26\_ss\_c\_lag\_all | 1.248783 .1181654 2.35 0.019 1.037391 1.503251

sp48\_27\_ss\_c\_lag\_all | 1.042409 .1364091 0.32 0.751 .8065855 1.347181

sp48\_28\_ss\_c\_lag\_all | .9174647 .142795 -0.55 0.580 .6762505 1.244718

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

sp48\_5\_ss\_c\_lag\_all | 1.10676 .2147768 0.52 0.601 .7566068 1.618963

sp48\_6\_ss\_c\_lag\_all | .9323619 .1182431 -0.55 0.581 .7271671 1.195459

sp48\_7\_ss\_c\_lag\_all | .9180746 .0971447 -0.81 0.419 .7461211 1.129657

sp48\_8\_ss\_c\_lag\_all | 1.183725 .255931 0.78 0.435 .7748434 1.80837

sp75\_100\_ss\_c\_lag\_all | 1.719886 .7176596 1.30 0.194 .7591326 3.896565

sp75\_1002\_ss\_c\_lag\_all | 1.058363 .2232031 0.27 0.788 .7000365 1.600105

sp75\_1003\_ss\_c\_lag\_all | .97074 .0555049 -0.52 0.604 .8678266 1.085858

sp75\_1003\_2\_ss\_c\_lag\_all | 2.029981 1.815633 0.79 0.429 .3516982 11.71693

sp75\_1311\_ss\_c\_lag\_all | .893875 .2693765 -0.37 0.710 .4951767 1.61359

sp75\_1315\_ss\_c\_lag\_all | 1.02865 1.032735 0.03 0.978 .1437758 7.359518

sp75\_1316\_ss\_c\_lag\_all | .8590235 .2768004 -0.47 0.637 .4567989 1.615418

sp75\_1318\_ss\_c\_lag\_all | .9419989 .139766 -0.40 0.687 .7042975 1.259925

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

sp75\_1400\_ss\_c\_lag\_all | 1.202304 .1885181 1.18 0.240 .8841949 1.634859

sp75\_1400\_1\_ss\_c\_lag\_all | .3803084 .1836157 -2.00 0.045 .1476282 .9797208

sp75\_1403\_10\_ss\_c\_lag\_all | 1.061671 .0339524 1.87 0.061 .9971677 1.130346

sp75\_1403\_5\_ss\_c\_lag\_all | 1.000945 .0284052 0.03 0.973 .9467916 1.058195

sp75\_1403\_6\_ss\_c\_lag\_all | 1.044687 .0277226 1.65 0.099 .9917407 1.10046

sp75\_1403\_7\_ss\_c\_lag\_all | .7115216 .072965 -3.32 0.001 .5819682 .8699153

sp75\_1403\_8\_ss\_c\_lag\_all | .9961986 .0227933 -0.17 0.868 .9525114 1.04189

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

sp75\_1404\_1\_ss\_c\_lag\_all | .6249868 .2129709 -1.38 0.168 .3204903 1.218784

sp75\_1405\_ss\_c\_lag\_all | 1.04275 .0837772 0.52 0.602 .8908256 1.220585

sp75\_1405\_1\_ss\_c\_lag\_all | 1.025331 .3475325 0.07 0.941 .5276577 1.992398

sp75\_153\_ss\_c\_lag\_all | 4.229197 4.215258 1.45 0.148 .5996003 29.83005

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

sp75\_156\_ss\_c\_lag\_all | .2303243 .0828799 -4.08 0.000 .1137741 .4662686

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

sp75\_1719\_4\_ss\_c\_lag\_all | 1.00826 .1164097 0.07 0.943 .8040741 1.264296

sp75\_1720\_ss\_c\_lag\_all | 1.086814 .0458908 1.97 0.049 1.000491 1.180585

sp75\_1725\_ss\_c\_lag\_all | .9943797 .0066794 -0.84 0.401 .9813741 1.007558

sp75\_1906\_ss\_c\_lag\_all | 6.416169 7.680966 1.55 0.120 .6141577 67.03038

sp75\_1916\_ss\_c\_lag\_all | .8203668 .1507881 -1.08 0.281 .5722059 1.176153

sp75\_203\_ss\_c\_lag\_all | .9816916 .0171549 -1.06 0.290 .9486379 1.015897

sp75\_204\_ss\_c\_lag\_all | 1.097213 .0535675 1.90 0.057 .9970899 1.207391

sp75\_205\_ss\_c\_lag\_all | 2.581583 .6875796 3.56 0.000 1.531711 4.351063

sp75\_207\_ss\_c\_lag\_all | 1.348562 .2144215 1.88 0.060 .9874836 1.841671

sp75\_208\_ss\_c\_lag\_all | 1.003461 .0213792 0.16 0.871 .9624213 1.04625

sp75\_209\_ss\_c\_lag\_all | 1.100178 .0865876 1.21 0.225 .9429107 1.283675

sp75\_212\_ss\_c\_lag\_all | .9885623 .0857407 -0.13 0.894 .8340211 1.17174

sp75\_213\_ss\_c\_lag\_all | .621384 .2524374 -1.17 0.242 .2802588 1.37772

sp75\_215\_ss\_c\_lag\_all | .461291 .5111317 -0.70 0.485 .052578 4.047116

sp75\_332\_ss\_c\_lag\_all | .91111 .1258473 -0.67 0.500 .6950218 1.194382

sp75\_334\_ss\_c\_lag\_all | .8500795 .0673693 -2.05 0.040 .727782 .992928

sp75\_337\_ss\_c\_lag\_all | .9564323 .1558135 -0.27 0.785 .6949987 1.316208

sp75\_340\_ss\_c\_lag\_all | 1.037965 .0322262 1.20 0.230 .9766865 1.103089

sp75\_343\_ss\_c\_lag\_all | .5457696 .1104736 -2.99 0.003 .3670377 .8115362

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

sp75\_388\_ss\_c\_lag\_all | 1.103362 .1169321 0.93 0.353 .8964158 1.358084

sp75\_389\_ss\_c\_lag\_all | .8327071 .2230387 -0.68 0.494 .4926062 1.407617

sp75\_500\_ss\_c\_lag\_all | 1.451125 .3340492 1.62 0.106 .9241833 2.278513

sp75\_500\_1\_ss\_c\_lag\_all | .4333371 .4275546 -0.85 0.397 .0626589 2.996877

sp75\_501\_ss\_c\_lag\_all | 9.438863 10.73842 1.97 0.048 1.015134 87.7639

sp75\_501\_2\_ss\_c\_lag\_all | .8122322 .3148145 -0.54 0.592 .3799806 1.736197

sp75\_502\_ss\_c\_lag\_all | 1.040739 .5132256 0.08 0.935 .3958986 2.735897

sp75\_503\_ss\_c\_lag\_all | 1.00135 .0052059 0.26 0.795 .9911983 1.011606

sp75\_505\_ss\_c\_lag\_all | 1.001808 .2540863 0.01 0.994 .6093914 1.646921

sp75\_506\_1\_ss\_c\_lag\_all | .7622055 .2389089 -0.87 0.386 .4123518 1.408887

sp75\_507\_ss\_c\_lag\_all | 1.187435 .1260034 1.62 0.105 .9644625 1.461955

sp75\_507\_1\_ss\_c\_lag\_all | 1.036161 .1080359 0.34 0.733 .8446489 1.271096

sp75\_509\_ss\_c\_lag\_all | 1.543987 .2532324 2.65 0.008 1.119531 2.129369

sp75\_512\_1\_ss\_c\_lag\_all | 1.178481 1.018622 0.19 0.849 .2165635 6.412984

sp75\_523\_ss\_c\_lag\_all | .9759042 .0279699 -0.85 0.395 .9225956 1.032293

sp75\_523\_3\_ss\_c\_lag\_all | .9707248 .0138954 -2.08 0.038 .9438689 .9983449

sp75\_524\_ss\_c\_lag\_all | 1.250586 .1067859 2.62 0.009 1.057866 1.478416

sp75\_602\_ss\_c\_lag\_all | 1.096667 .1727697 0.59 0.558 .805334 1.493392

sp75\_603\_ss\_c\_lag\_all | 1.413069 .2720715 1.80 0.073 .9688881 2.060883

sp75\_604\_ss\_c\_lag\_all | 1.011152 .0099709 1.12 0.261 .9917972 1.030885

sp75\_605\_ss\_c\_lag\_all | 1.013826 .0436028 0.32 0.750 .9318689 1.102991

sp75\_606\_ss\_c\_lag\_all | .9987384 .0242603 -0.05 0.959 .9523032 1.047438

sp75\_607\_ss\_c\_lag\_all | .9873851 .068199 -0.18 0.854 .8623703 1.130523

sp75\_703\_3\_ss\_c\_lag\_all | 1.260592 .2448685 1.19 0.233 .8614487 1.844673

sp75\_807\_ss\_c\_lag\_all | .98175 .0311427 -0.58 0.561 .9225701 1.044726

sp75\_810\_ss\_c\_lag\_all | 1.080734 .1466318 0.57 0.567 .8283802 1.409965

sp75\_811\_ss\_c\_lag\_all | .6704307 .1054912 -2.54 0.011 .4925141 .9126181

sp75\_812\_ss\_c\_lag\_all | .9035087 .2863132 -0.32 0.749 .4855062 1.681396

sp75\_816\_ss\_c\_lag\_all | 1.042536 .1513632 0.29 0.774 .7843449 1.385718

sp75\_817\_ss\_c\_lag\_all | .4649295 .6914693 -0.51 0.607 .0252019 8.577126

sp75\_906\_ss\_c\_lag\_all | .7417117 .1935375 -1.15 0.252 .4447624 1.236922

mine\_time | 1.001009 .0044666 0.23 0.821 .9922925 1.009801

onsite\_insp\_hours | 1.003933 .0004777 8.25 0.000 1.002997 1.004869

|

state |

AL | 1.24263 .3911891 0.69 0.490 .670467 2.303066

CO | 1.690833 .2529805 3.51 0.000 1.261087 2.267026

IL | 6.165772 1.898246 5.91 0.000 3.372325 11.27315

IN | 1.979208 .7411131 1.82 0.068 .9500786 4.123095

MD | 2.407912 .9042559 2.34 0.019 1.153412 5.02686

MT | 1 (empty)

NM | 2.334179 .3976653 4.98 0.000 1.671545 3.259494

OH | 1.330118 .2942439 1.29 0.197 .8621649 2.052059

OK | 7.248175 2.43669 5.89 0.000 3.750351 14.0083

PA | 1.752971 .2192532 4.49 0.000 1.371862 2.239953

TN | 1.860415 .3785964 3.05 0.002 1.248502 2.772236

UT | .6491988 .1771235 -1.58 0.113 .3803128 1.108191

VA | 1.149046 .1076953 1.48 0.138 .9562202 1.380756

WV | 1.763004 .1493266 6.69 0.000 1.493332 2.081374

WY | 3.610783 2.508381 1.85 0.065 .9252921 14.09042

|

time |

2000.25 | 1.474863 .1969329 2.91 0.004 1.135257 1.916062

2000.5 | 1.55823 .2235561 3.09 0.002 1.176282 2.0642

2000.75 | .7680432 .1035968 -1.96 0.050 .5896199 1.000459

2001 | .9553841 .134364 -0.32 0.746 .7252139 1.258606

2001.25 | .9508244 .1332488 -0.36 0.719 .7224582 1.251376

2001.5 | 1.191976 .1824552 1.15 0.251 .8830277 1.609016

2001.75 | .9479116 .1432088 -0.35 0.723 .7049687 1.274576

2002 | 1.052955 .1575142 0.34 0.730 .7853743 1.411703

2002.25 | .8622132 .1337826 -0.96 0.339 .6361223 1.168661

2002.5 | 1.24014 .2031936 1.31 0.189 .8995051 1.709771

2002.75 | .7812775 .1242292 -1.55 0.121 .5720812 1.066972

2003 | .9031375 .1600156 -0.58 0.565 .6381755 1.278108

2003.25 | .9166561 .1594676 -0.50 0.617 .6518171 1.289101

2003.5 | 1.384582 .23579 1.91 0.056 .9916577 1.933195

2003.75 | .7187457 .1245185 -1.91 0.057 .511811 1.009348

2004 | .7482727 .1265302 -1.71 0.086 .5371861 1.042305

2004.25 | .6894802 .1152363 -2.22 0.026 .4968853 .9567257

2004.5 | .7227792 .1227627 -1.91 0.056 .5181203 1.008279

2004.75 | .571404 .0968531 -3.30 0.001 .4098873 .7965665

2005 | .7017681 .1218034 -2.04 0.041 .4994057 .9861288

2005.25 | .6128244 .1036201 -2.90 0.004 .4399564 .8536158

2005.5 | .7088815 .1261548 -1.93 0.053 .5001394 1.004746

2005.75 | .5216593 .0920022 -3.69 0.000 .3692031 .7370699

2006 | .6518411 .1229514 -2.27 0.023 .4503878 .9434022

2006.25 | .5421419 .09357 -3.55 0.000 .3865461 .7603693

2006.5 | .6617786 .1168467 -2.34 0.019 .4681884 .935416

2006.75 | .5510636 .1005297 -3.27 0.001 .385406 .7879254

2007 | .5217516 .094202 -3.60 0.000 .3662518 .7432721

2007.25 | .4516134 .0813819 -4.41 0.000 .3172328 .6429178

2007.5 | .5762222 .1051427 -3.02 0.003 .4029694 .8239634

2007.75 | .4555285 .0806412 -4.44 0.000 .3219802 .6444689

2008 | .4406752 .080792 -4.47 0.000 .3076536 .6312121

2008.25 | .4495175 .0846208 -4.25 0.000 .3108204 .6501052

2008.5 | .4246613 .0764021 -4.76 0.000 .2984699 .6042059

2008.75 | .4426992 .0778709 -4.63 0.000 .3136044 .6249356

2009 | .5075706 .0930014 -3.70 0.000 .3544314 .7268768

2009.25 | .5231696 .1042352 -3.25 0.001 .3540388 .7730973

2009.5 | .4055734 .0824394 -4.44 0.000 .2723008 .6040738

2009.75 | .4445217 .0869629 -4.14 0.000 .3029496 .6522523

2010 | .4272197 .0904514 -4.02 0.000 .2821201 .6469467

2010.25 | .4476739 .0898203 -4.01 0.000 .3021193 .6633534

2010.5 | .6399814 .1341368 -2.13 0.033 .4243849 .9651056

2010.75 | .3788285 .0792883 -4.64 0.000 .2513549 .57095

2011 | .4337881 .0898003 -4.03 0.000 .2891124 .6508614

2011.25 | .4102677 .0836984 -4.37 0.000 .2750517 .6119561

2011.5 | .5416064 .107593 -3.09 0.002 .3669342 .7994282

2011.75 | .4389916 .0919443 -3.93 0.000 .2911903 .6618135

2012 | .3475133 .0706259 -5.20 0.000 .233335 .5175628

2012.25 | .4867888 .1010364 -3.47 0.001 .3240916 .7311617

2012.5 | .4368919 .0967112 -3.74 0.000 .2831069 .6742137

2012.75 | .1718346 .0391065 -7.74 0.000 .1099999 .2684287

2013 | .3638579 .0850504 -4.33 0.000 .2301266 .5753033

2013.25 | .3588031 .085591 -4.30 0.000 .2248047 .5726732

2013.5 | .2809846 .0688723 -5.18 0.000 .1737977 .4542773

2013.75 | .2237991 .0540038 -6.20 0.000 .1394631 .3591348

2014 | .2785639 .07165 -4.97 0.000 .1682617 .4611734

2014.25 | .2381743 .0613098 -5.57 0.000 .1438077 .3944641

2014.5 | .2646695 .0665427 -5.29 0.000 .1616949 .433223

2014.75 | .3912751 .1057766 -3.47 0.001 .2303403 .6646523

2015 | .2855673 .0709429 -5.04 0.000 .1754875 .4646978

2015.25 | .1724502 .0439288 -6.90 0.000 .1046729 .2841143

2015.5 | .3276325 .0855578 -4.27 0.000 .1963833 .5465998

2015.75 | .196693 .0534782 -5.98 0.000 .1154406 .3351345

2016 | .1256595 .0407248 -6.40 0.000 .066578 .2371702

|

\_cons | .0000736 8.24e-06 -85.07 0.000 .0000591 .0000917

lnhours | 1 (offset)

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

(est1 stored)

**. lfit**

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

number of observations = 19180

number of covariate patterns = 19150

Pearson chi2(18990) = 66543.94

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -12634.185

Iteration 1: log likelihood = -9292.6565

Iteration 2: log likelihood = -8868.0518

Iteration 3: log likelihood = -8751.6335

Iteration 4: log likelihood = -8751.1843

Iteration 5: log likelihood = -8751.1842

Logistic regression Number of obs = 19,180

LR chi2(2) = 7766.00

Prob > chi2 = 0.0000

Log likelihood = -8751.1842 Pseudo R2 = 0.3073

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

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

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

\_hat | .9740763 .016797 57.99 0.000 .9411547 1.006998

\_hatsq | .1369127 .0053294 25.69 0.000 .1264672 .1473582

\_cons | -.1731768 .0203162 -8.52 0.000 -.2129959 -.1333578

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

Note: 0 failures and 186 successes completely determined.

**. estat classification**

Logistic model for dv\_indicator

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

Classified | D ~D | Total

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

+ | 10387 2564 | 12951

- | 1705 4524 | 6229

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

Total | 12092 7088 | 19180

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

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

Sensitivity Pr( +| D) 85.90%

Specificity Pr( -|~D) 63.83%

Positive predictive value Pr( D| +) 80.20%

Negative predictive value Pr(~D| -) 72.63%

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

False + rate for true ~D Pr( +|~D) 36.17%

False - rate for true D Pr( -| D) 14.10%

False + rate for classified + Pr(~D| +) 19.80%

False - rate for classified - Pr( D| -) 27.37%

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

Correctly classified 77.74%

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

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

Variable | Obs Mean Std. Dev. Min Max

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

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

bssv4\_yhat | 19,180 .6304484 .2813184 .0002499 .9999955