

# The Effects of Third Party Certification on Voluntary Self-Regulation of Accidents in the U.S. Chemical Industry

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## Unpublished Supplemental Appendix

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Table UA1: Effects of third party certification on accidents: Bivariate probit model (trimmed sample)

	Coef.	Std. Err.
<i>Equation 1: RC equation</i>		
Public dummy	1.3458***	0.0404
Dummy for a single facility firm	-1.3631***	0.1191
Facility number	0.0205***	0.0016
Firm TRI in t-1	0.1761***	0.0090
Firm HAP/TRI ratio in t-1	-0.3292***	0.0489
OSHA penalty in t-5 to t-2	-4.8641	5.6784
OSHA penalty in t-1	-1.2261	4.7845
OSHA inspections in t-5 to t-2	-0.0308	0.0231
OSHA inspections in t-1	-0.0445	0.0505
State OSHA penalty in t-1	1.4875***	0.3163
State OSHA inspections in t-1	0.0041***	0.0010
Facility to firm TRI ratio in t-1	0.1127	0.2452
Year dummies		YES
Constant	-1.6699***	0.0837
<i>Equation 2: Accident equation</i>		
Treatment	0.2101	0.1549
OSHA penalty in t-5 to t-2	-1.1547	12.9529
OSHA penalty in t-1	-2.9949	13.4398
OSHA inspections in t-5 to t-2	0.0506	0.0496
OSHA inspections in t-1	0.1177	0.1078
State OSHA penalty in t-1	0.9859	0.8724
State OSHA inspections in t-1	0.0024	0.0028
Facility to firm TRI ratio in t-1	0.4498	0.6301
Year dummies		YES
Constant	-2.7072***	0.9174
Observations		10,315

Note: in the bivariate probit model, the coefficient of the third party certification is no longer the difference-in-difference estimator.

Table UA2: Average treatment effects of third party certification on injuries (trimmed sample)

	Exogenous Treatment	Endogenous Treatment		
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment	-0.0412 (0.0376)	0.7433 (18.6449)	-0.0412 (0.0370)	-0.0418 (0.0361)
OSHA penalty in t-5 to t-2	-2.0949 (1.7338)	-1.0652 (52.2932)	-2.0957 (1.7380)	-2.0850 (1.4524)
OSHA penalty in t-1	0.0526 (3.1560)	-0.3678 (25.1698)	0.0510 (2.9176)	0.0350 (2.3036)
OSHA inspections in t-5 to t-2	-0.0092* (0.0053)	-0.0173 (0.5306)	-0.0092* (0.0050)	-0.0092* (0.0051)
OSHA inspections in t-1	-0.0163** (0.0079)	-0.0209 (0.5624)	-0.0163* (0.0083)	-0.0160** (0.0079)
State OSHA penalty in t-1	-0.1782 (0.1497)	0.1384 (6.0577)	-0.1782 (0.1563)	-0.1864 (0.1533)
State OSHA inspections in t-1	-0.0002 (0.0002)	-0.0005 (0.0073)	-0.0002 (0.0002)	-0.0002 (0.0002)
Facility to firm TRI ratio in t-1	-0.0378 (0.0489)	-0.0733 (1.6351)	-0.0375 (0.0497)	-0.0257 (0.0559)
RC residual	- -	- -	-0.0001 (0.0031)	- -
Inverse Mills ratio	- -	- -	- -	-0.0121 (0.0136)
Year and Facility dummies	YES	YES	YES	YES
Observations	10,315	10,315	10,315	10,315

Notes: The model is estimated as a random effects probit model. The penalty and TRI emission are both measured by one million units. The five instrumental variables are jointly significant at 1% level. Statistically significant at the \*\*\* 1%, \*\* 5%, and \*10% level, respectively.

Table UA3: Yearly treatment effects of third party certification on injuries (trimmed sample)

	Exogenous RC		Endogenous RC	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment*year2005	-0.0287 (0.0382)	-0.0169 (0.0507)	-0.0287 (0.0380)	-0.0293 (0.0381)
Treatment*year2006	-0.0255 (0.0347)	-0.0057 (0.0305)	-0.0254 (0.0353)	-0.0263 (0.0356)
Treatment*year2007	-0.0423 (0.0370)	0.0060 (0.0645)	-0.0424 (0.0370)	-0.0429 (0.0366)
Treatment*year2008	-0.0573 (0.0392)	0.0227 (0.0613)	-0.0574 (0.0391)	-0.0578 (0.0401)
Treatment*year2009	-0.0457 (0.0355)	-0.0346 (0.0442)	-0.0456 (0.0353)	-0.0462 (0.0358)
Treatment*year2010	-0.0493 (0.0435)	-0.0128 (0.0860)	-0.0492 (0.0446)	-0.0497 (0.0453)
OSHA penalty in t-5 to t-2	-2.0832 (1.6399)	-2.0136 (1.6626)	-2.0841 (1.7737)	-2.0737 (1.8867)
OSHA penalty in t-1	0.0397 (2.7545)	0.0280 (2.5419)	0.0382 (3.1231)	0.0226 (2.9236)
OSHA inspections in t-5 to t-2	-0.0092* (0.0048)	-0.0098** (0.0047)	-0.0092* (0.0049)	-0.0093* (0.0050)
OSHA inspections in t-1	-0.0164* (0.0086)	-0.0164** (0.0083)	-0.0164** (0.0080)	-0.0162* (0.0087)
State OSHA penalty in t-1	-0.1802 (0.1495)	-0.1586 (0.1386)	-0.1803 (0.1540)	-0.1884 (0.1599)
State OSHA inspections in t-1	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)
Facility to firm TRI ratio in t-1	-0.0398 (0.0488)	-0.0403 (0.0521)	-0.0394 (0.0524)	-0.0277 (0.0575)
RC residual	-	-	-0.0002 (0.0032)	-
Inverse Mills ratio	-	-	-	-0.0120 (0.0142)
Year and Facility dummies	YES	YES	YES	YES
Observations	10,315	10,315	10,315	10,315

Notes: The model is estimated as a random effects probit model. The penalty and TRI emission are both measured by one million units. The five instrumental variables are jointly significant at 1% level. Statistically significant at the \*\*\* 1%, \*\* 5%, and \*10% level, respectively.

Table UA4: Average treatment effects of third party certification on hospitalizations (trimmed sample)

	Exogenous Treatment	Endogenous Treatment		
	Model 1	Model 2 Indirect IV	Model 3 Control function	Model 4 Heckman selection
Treatment	-0.0410 (0.0397)	0.5847 (2.9971)	-0.0409 (0.0387)	-0.0414 (0.0393)
OSHA penalty in t-5 to t-2	-1.6892 (1.6241)	-0.8681 (5.4570)	-1.6899 (1.7214)	-1.6820 (1.6774)
OSHA penalty in t-1	-0.1086 (2.9661)	-0.4438 (6.9359)	-0.1097 (2.3904)	-0.1214 (2.3248)
OSHA inspections in t-5 to t-2	-0.0094** (0.0044)	-0.0159 (0.0440)	-0.0094** (0.0043)	-0.0094** (0.0043)
OSHA inspections in t-1	-0.0129* (0.0071)	-0.0166 (0.0288)	-0.0129* (0.0075)	-0.0127* (0.0077)
State OSHA penalty in t-1	-0.1653 (0.1553)	0.0871 (1.2045)	-0.1654 (0.1561)	-0.1713 (0.1659)
State OSHA inspections in t-1	-0.0001 (0.0002)	-0.0004 (0.0019)	-0.0001 (0.0002)	-0.0001 (0.0002)
Facility to firm TRI ratio in t-1	-0.0191 (0.0407)	-0.0474 (0.3192)	-0.0188 (0.0431)	-0.0103 (0.0479)
RC residual	-	-	-0.0001 (0.0026)	-
Inverse Mills ratio	-	-	-	-0.0088 (0.0147)
Year and Facility dummies	YES	YES	YES	YES
Observations	10,315	10,315	10,315	10,315

Notes: The model is estimated as a random effects probit model. The penalty and TRI emission are both measured by one million units. The five instrumental variables are jointly significant at 1% level. Statistically significant at the \*\*\* 1%, \*\* 5%, and \*10% level, respectively.

Table UA5: Yearly treatment effects of third party certification on hospitalizations (trimmed sample)

	Exogenous Treatment		Endogenous Treatment	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment*year2005	-0.0292 (0.0377)	-0.0358 (0.0469)	-0.0292 (0.0393)	-0.0297 (0.0375)
Treatment*year2006	-0.0369 (0.0353)	-0.0277 (0.0191)	-0.0369 (0.0368)	-0.0375 (0.0352)
Treatment*year2007	-0.0389 (0.0370)	-0.0048 (0.0622)	-0.0389 (0.0389)	-0.0393 (0.0361)
Treatment*year2008	-0.0518 (0.0383)	0.0146 (0.0441)	-0.0518 (0.0393)	-0.0521 (0.0380)
Treatment*year2009	-0.0441 (0.0362)	-0.0287 (0.0402)	-0.0441 (0.0372)	-0.0445 (0.0353)
Treatment*year2010	-0.0453 (0.0453)	-0.0102 (0.0764)	-0.0452 (0.0466)	-0.0456 (0.0432)
OSHA penalty in t-5 to t-2	-1.6846 (1.5342)	-1.6436 (1.6824)	-1.6853 (1.6976)	-1.6776 (1.4961)
OSHA penalty in t-1	-0.1141 (2.2140)	-0.1129 (2.7889)	-0.1153 (2.3534)	-0.1267 (2.3988)
OSHA inspections in t-5 to t-2	-0.0094** (0.0039)	-0.0098** (0.0044)	-0.0094** (0.0042)	-0.0094** (0.0041)
OSHA inspections in t-1	-0.0130* (0.0076)	-0.0129* (0.0075)	-0.0130* (0.0078)	-0.0128* (0.0070)
State OSHA penalty in t-1	-0.1664 (0.1501)	-0.1505 (0.1379)	-0.1665 (0.1556)	-0.1724 (0.1522)
State OSHA inspections in t-1	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
Facility to firm TRI ratio in t-1	-0.0204 (0.0403)	-0.0188 (0.0401)	-0.0201 (0.0432)	-0.0116 (0.0447)
RC residual	-	-	-0.0001 (0.0024)	-
Inverse Mills ratio	-	-	-	-0.0088 (0.0132)
Year and Facility dummies	YES	YES	YES	YES
Constant	0.0423 (0.0258)	0.0432* (0.0259)	0.0425 (0.0282)	0.0439 (0.0270)
Observations	10,315	10,315	10,315	10,315

Notes: The model is estimated as a random effects probit model. The penalty and TRI emission are both measured by one million units. The five instrumental variables are jointly significant at 1% level. Statistically significant at the \*\*\* 1%, \*\* 5%, and \*10% level, respectively.

Table UA6: Effect of RC on accidents (trimmed sample): Pooled bivariate probit model following Finger and Gamper-Rabindran (2013)

RC participation equation			
	[1995-2004]	[2005-2010]	[1995-2010]
Firm HAP/TRI	-0.6467 (0.3403)*	-0.0765 (0.4238)	-0.3939 (0.3426)
Facility OSHA penalty in t-5 to t-2	-6.1042 (9.7754)	-0.9517 (10.1864)	-2.2804 (7.5740)
Facility OSHA penalty in t-1	-31.8927 (16.2940)*	2.3992 (3.7188)	0.2223 (3.2159)
Facility OSHA inspections in t-5 to t-2	-0.1049 (0.0561)*	-0.0668 (0.0557)	-0.0873 (0.0458)*
Facility OSHA inspections in t-1	-0.0375 (0.0763)	-0.0712 (0.0908)	-0.0703 (0.0629)
Federal OSHA	-0.2366 (0.1256)*	-0.1545 (0.1216)	-0.1926 (0.1146)*
Log(facility TRI)	-0.0015 (0.0259)	-0.0139 (0.0209)	-0.0072 (0.0221)
Log(firm TRI)	0.2702 (0.0584)***	0.3329 (0.0704)***	0.2903 (0.0590)***
Log(facility number)	0.6566 (0.1887)***	0.5043 (0.1908)***	0.5855 (0.1776)***
Dummy for a single facility firm	0.7383 (0.4974)	0.2988 (0.5058)	0.6117 (0.4260)
% of county white	-0.0170 (0.0063)***	-0.0156 (0.0064)**	-0.0164 (0.0061)***
County poverty rate	-0.0456 (0.0228)**	-0.0497 (0.0227)**	-0.0475 (0.0216)**
% of county high school and lower	0.0076 (0.0076)	0.0051 (0.0072)	0.0061 (0.0069)
NAICS dummies	Included	Included	Included
Year dummies	Included	Included	Included
Constant	-2.8992 (0.9064)***	-3.2280 (1.0443)***	-2.9891 (0.8871)***
Accident equation			
	[1995-2004]	[2005-2010]	[1995-2010]
RC dummy	0.4862 (0.3118)	-0.8831 (0.5141)*	-0.6293 (0.5604)
Facility OSHA penalty in t-5 to t-2	8.0094 (6.5051)	-6.7860 (13.0150)	-0.1916 (7.4696)
Facility OSHA penalty in t-1	1.5928 (7.0319)	-15.9685 (28.3431)	-2.5673 (5.6120)
Facility OSHA inspections in t-5 to t-2	-0.0157 (0.0733)	0.0655 (0.0428)	0.0288 (0.0413)
Facility OSHA inspections in t-1	0.0108 (0.1573)	0.1567 (0.1100)	0.1043 (0.0943)
Federal OSHA	0.0069 (0.1236)	0.1443 (0.1484)	0.0612 (0.0984)
Log(facility TRI)	0.0620 (0.0225)***	0.0294 (0.0227)	0.0403 (0.0161)**
Log(firm TRI)	-0.0119 (0.0257)	0.0420 (0.0399)	0.0307 (0.0380)
Log(facility number)	-0.0343 (0.1234)	0.0982 (0.1006)	0.1207 (0.0856)
Dummy for a single facility firm	0.6294	0.2139	0.5619

	(0.2463)**	(0.2732)	(0.1918)***
% of county white	-0.0070	-0.0039	-0.0075
	(0.0049)	(0.0065)	(0.0047)
County poverty rate	-0.0215	0.0198	-0.0070
	(0.0189)	(0.0198)	(0.0143)
% of county high school and lower	0.0021	-0.0059	0.0001
	(0.0071)	(0.0083)	(0.0059)
NAICS dummies	Included	Included	Included
Year dummies	Included	Included	Included
Constant	-1.9961	-6.4237	-2.2225
	(0.7978)**	(0.3475)***	(0.5930)***
Observations	5,444	4,871	10,315

Notes: The model is estimated as a bivariate probit model for pre-treatment, post-treatment, and entire duration, respectively. Statistically significant at the \*\*\* 1%, \*\* 5%, and \*10% level, respectively.

Table UA7: Average treatment effects of third party certification on accidents (original sample)

	Exogenous Treatment		Endogenous Treatment	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment	0.0009 (0.0028)	0.0426 (0.1138)	0.0009 (0.0028)	0.0009 (0.0028)
OSHA penalty in t-5 to t-2	-0.0423 (0.0451)	-0.0307 (0.0569)	-0.0421 (0.0452)	-0.0423 (0.0497)
OSHA penalty in t-1	-0.3382*** (0.1009)	-0.3279*** (0.1077)	-0.3381*** (0.1010)	-0.3382*** (0.1057)
OSHA inspections in t-5 to t-2	-0.0063*** (0.0014)	-0.0065*** (0.0015)	-0.0063*** (0.0014)	-0.0063*** (0.0013)
OSHA inspections in t-1	-0.0045* (0.0026)	-0.0045 (0.0028)	-0.0045* (0.0026)	-0.0045 (0.0028)
State OSHA penalty in t-1	-0.0002 (0.0028)	0.0019 (0.0070)	-0.0001 (0.0028)	-0.0001 (0.0029)
State OSHA inspections in t-1	-0.0000 (0.0000)	0.0000 (0.0001)	-0.0000 (0.0000)	-0.0000 (0.0001)
Facility to firm TRI ratio in t-1	-0.0041 (0.0034)	-0.0040 (0.0034)	-0.0043 (0.0034)	-0.0041 (0.0036)
RC residual	-	-	0.0013 (0.0059)	-
Inverse Mills ratio	-	-	-	0.0001 (0.0016)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281



Table UA8: Yearly treatment effects of third party certification on accidents (original sample)

	Exogenous Treatment	Endogenous Treatment		
	Model 1	Model 2 Indirect IV	Model 3 Control function	Model 4 Heckman selection
Treatment*year2005	0.0017 (0.0058)	0.0143 (0.0142)	0.0017 (0.0062)	0.0017 (0.0061)
Treatment*year2006	0.0100 (0.0063)	0.0171 (0.0116)	0.0100 (0.0067)	0.0100 (0.0065)
Treatment*year2007	-0.0020 (0.0051)	0.0136 (0.0119)	-0.0020 (0.0049)	-0.0020 (0.0049)
Treatment*year2008	-0.0032 (0.0046)	0.0015 (0.0077)	-0.0032 (0.0044)	-0.0032 (0.0046)
Treatment*year2009	-0.0072** (0.0029)	0.0008 (0.0066)	-0.0072** (0.0029)	-0.0072** (0.0031)
Treatment*year2010	0.0060 (0.0056)	0.0199 (0.0133)	0.0060 (0.0056)	0.0060 (0.0057)
OSHA penalty in t-5 to t-2	-0.0424 (0.0440)	-0.0398 (0.0416)	-0.0423 (0.0482)	-0.0424 (0.0448)
OSHA penalty in t-1	-0.3384*** (0.0984)	-0.3352*** (0.0942)	-0.3383*** (0.0869)	-0.3384*** (0.0940)
OSHA inspections in t-5 to t-2	-0.0063*** (0.0013)	-0.0064*** (0.0013)	-0.0063*** (0.0013)	-0.0063*** (0.0013)
OSHA inspections in t-1	-0.0045* (0.0027)	-0.0045 (0.0028)	-0.0045* (0.0027)	-0.0045 (0.0028)
State OSHA penalty in t-1	-0.0003 (0.0028)	0.0002 (0.0030)	-0.0002 (0.0029)	-0.0003 (0.0029)
State OSHA inspections in t-1	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0001)	-0.0000 (0.0001)
Facility to firm TRI ratio in t-1	-0.0041 (0.0035)	-0.0041 (0.0035)	-0.0042 (0.0035)	-0.0041 (0.0035)
RC residual	-	-	0.0012 (0.0064)	-
Inverse Mills ratio	-	-	-	0.0001 (0.0016)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281

Table UA9: Average treatment effects of third party certification on injuries (original sample)

	Exogenous Treatment		Endogenous Treatment	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment	-0.0235 (0.0265)	-1.3239 (1.1077)	-0.0236 (0.0231)	-0.0235 (0.0251)
OSHA penalty in t-5 to t-2	-0.2604 (0.2472)	-0.6235 (0.4353)	-0.2598 (0.2429)	-0.2604 (0.2739)
OSHA penalty in t-1	-0.7713 (0.5878)	-1.0910 (0.8215)	-0.7712 (0.6023)	-0.7713 (0.5891)
OSHA inspections in t-5 to t-2	-0.0062 (0.0054)	0.0006 (0.0081)	-0.0061 (0.0051)	-0.0062 (0.0056)
OSHA inspections in t-1	-0.0243** (0.0118)	-0.0256** (0.0128)	-0.0243* (0.0127)	-0.0243** (0.0117)
State OSHA penalty in t-1	-0.0220 (0.0244)	-0.0861 (0.0697)	-0.0219 (0.0209)	-0.0220 (0.0238)
State OSHA inspections in t-1	0.0000 (0.0001)	-0.0004 (0.0004)	0.0000 (0.0001)	0.0000 (0.0001)
Facility to firm TRI ratio in t-1	0.0080 (0.0155)	0.0036 (0.0142)	0.0076 (0.0131)	0.0080 (0.0143)
RC residual	-	-	0.0041 (0.0485)	-
Inverse Mills ratio	-	-	-	0.0000 (0.0118)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281

Table UA10: Yearly treatment effects of third party certification on injuries (original sample)

	Exogenous Treatment		Endogenous Treatment	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment*year2005	-0.0116 (0.0264)	0.0101 (0.0201)	-0.0116 (0.0255)	-0.0171 (0.0237)
Treatment*year2006	-0.0125 (0.0241)	0.0159 (0.0141)	-0.0125 (0.0234)	-0.0282 (0.0226)
Treatment*year2007	-0.0447 (0.0524)	-0.0190 (0.0878)	-0.0448 (0.0487)	-0.0238 (0.0239)
Treatment*year2008	-0.0291 (0.0265)	0.0140 (0.0181)	-0.0291 (0.0251)	-0.0321 (0.0227)
Treatment*year2009	-0.0297 (0.0241)	-0.0102 (0.0173)	-0.0297 (0.0232)	-0.0312 (0.0226)
Treatment*year2010	-0.0138 (0.0251)	0.0367 (0.0333)	-0.0139 (0.0241)	-0.0164 (0.0244)
OSHA penalty in t-5 to t-2	-0.2604 (0.2767)	-0.2517 (0.2592)	-0.2599 (0.2933)	-0.0375 (0.0653)
OSHA penalty in t-1	-0.7717 (0.5857)	-0.7607 (0.5540)	-0.7716 (0.5828)	-0.0192 (0.0721)
OSHA inspections in t-5 to t-2	-0.0061 (0.0057)	-0.0063 (0.0054)	-0.0061 (0.0055)	-0.0066** (0.0034)
OSHA inspections in t-1	-0.0243** (0.0119)	-0.0243** (0.0115)	-0.0243** (0.0122)	-0.0138*** (0.0047)
State OSHA penalty in t-1	-0.0222 (0.0232)	-0.0208 (0.0204)	-0.0221 (0.0237)	-0.0242 (0.0217)
State OSHA inspections in t-1	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0002)	0.0000 (0.0001)
Facility to firm TRI ratio in t-1	0.0081 (0.0169)	0.0080 (0.0159)	0.0077 (0.0127)	-0.0029 (0.0042)
RC residual	-	-	0.0038 (0.0531)	-
Inverse Mills ratio	-	-	-	-0.0053 (0.0086)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281

Table UA11: Average treatment effects of third party certification on hospitalizations (original sample)

	Exogenous Treatment	Endogenous Treatment		
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment	-0.0247 (0.0231)	-0.4790 (0.6927)	-0.0245 (0.0220)	-0.0248 (0.0239)
OSHA penalty in t-5 to t-2	-0.0355 (0.0676)	-0.1623 (0.1959)	-0.0389 (0.0648)	-0.0372 (0.0774)
OSHA penalty in t-1	-0.0204 (0.0686)	-0.1320 (0.1866)	-0.0209 (0.0775)	-0.0206 (0.0833)
OSHA inspections in t-5 to t-2	-0.0066** (0.0033)	-0.0042** (0.0018)	-0.0066** (0.0033)	-0.0067* (0.0035)
OSHA inspections in t-1	-0.0138*** (0.0048)	-0.0143*** (0.0052)	-0.0138*** (0.0048)	-0.0138*** (0.0049)
State OSHA penalty in t-1	-0.0238 (0.0222)	-0.0462 (0.0545)	-0.0243 (0.0220)	-0.0240 (0.0230)
State OSHA inspections in t-1	0.0000 (0.0001)	-0.0001 (0.0003)	0.0000 (0.0001)	0.0000 (0.0001)
Facility to firm TRI ratio in t-1	-0.0046 (0.0038)	-0.0061 (0.0041)	-0.0019 (0.0052)	-0.0029 (0.0044)
RC residual	-	-	-0.0259 (0.0363)	-
Inverse Mills ratio	-	-	-	-0.0054 (0.0085)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281

Table UA12: Yearly treatment effects of third party certification on hospitalizations (original sample)

	Exogenous Treatment		Endogenous Treatment	
	Model 1	Model 2	Model 3	Model 4
		Indirect IV	Control function	Heckman selection
Treatment*year2005	-0.0170 (0.0235)	-0.0112 (0.0125)	-0.0169 (0.0261)	-0.0171 (0.0237)
Treatment*year2006	-0.0280 (0.0219)	-0.0090 (0.0073)	-0.0279 (0.0250)	-0.0282 (0.0226)
Treatment*year2007	-0.0237 (0.0220)	0.0016 (0.0206)	-0.0236 (0.0263)	-0.0238 (0.0239)
Treatment*year2008	-0.0322 (0.0229)	0.0015 (0.0131)	-0.0319 (0.0258)	-0.0321 (0.0227)
Treatment*year2009	-0.0312 (0.0227)	-0.0148 (0.0166)	-0.0311 (0.0253)	-0.0312 (0.0226)
Treatment*year2010	-0.0163 (0.0242)	0.0222 (0.0333)	-0.0158 (0.0263)	-0.0164 (0.0244)
OSHA penalty in t-5 to t-2	-0.0357 (0.0633)	-0.0295 (0.0594)	-0.0393 (0.0736)	-0.0375 (0.0653)
OSHA penalty in t-1	-0.0189 (0.0743)	-0.0111 (0.0782)	-0.0195 (0.0820)	-0.0192 (0.0721)
OSHA inspections in t-5 to t-2	-0.0066** (0.0032)	-0.0067* (0.0035)	-0.0066* (0.0037)	-0.0066** (0.0034)
OSHA inspections in t-1	-0.0138*** (0.0045)	-0.0138*** (0.0050)	-0.0138*** (0.0049)	-0.0138*** (0.0047)
State OSHA penalty in t-1	-0.0239 (0.0216)	-0.0229 (0.0222)	-0.0244 (0.0255)	-0.0242 (0.0217)
State OSHA inspections in t-1	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)
Facility to firm TRI ratio in t-1	-0.0046 (0.0035)	-0.0047 (0.0038)	-0.0019 (0.0055)	-0.0029 (0.0042)
RC residual	- -	- -	-0.0261 (0.0422)	- -
Inverse Mills ratio	- -	- -	- -	-0.0053 (0.0086)
Year and Facility dummies	YES	YES	YES	YES
Observations	20,281	20,281	20,281	20,281

Table UA13: Random effects probit model of facility belonging to RC (original sample)

	Coef.	Std. Err.
<i>Instruments</i>		
Firm TRI emission in t-1	0.2939***	0.0349
Facility number in t-1	0.0699***	0.0069
Dummy for a single facility firm	-1.0822***	0.2733
Public dummy	2.2960***	0.1697
Firm HAP/TRI ratio in t-1	-0.1704	0.2029
<i>Covariates</i>		
OSHA penalty in t-5 to t-2	1.8788	3.9693
OSHA penalty in t-1	0.8846	8.6783
OSHA inspections in t-5 to t-2	0.0192	0.0824
OSHA inspections in t-1	-0.0109	0.1868
State OSHA penalty in t-1	0.1731	0.2865
State OSHA inspections in t-1	0.0062*	0.0032
Facility to firm TRI ratio in t-1	0.0422	0.2333
Constant	-3.6671***	0.3311
Observations	20,281	

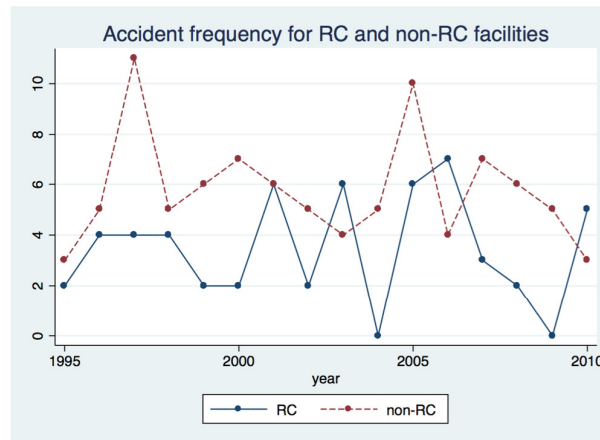


Figure UA1: Frequency of accidents in RC and non-RC facilities (original sample)