Supplemental Online Appendix

Workplace Safety and Worker Productivity: Evidence from the MINER Act

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Table A.1. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, with a Comparison Group Mine

	Injury rate	*Productivity*
Years 1 to 2	–0.216	–0.283***
	(0.563)	(0.096)
Years 3 to 4	–1.411***	–0.388***
	(0.497)	(0.128)
Years 5 and after	–1.492*	–0.281
	(0.772)	(0.227)
R^2	0.063	0.219
N	7,152	

Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: The sample includes mines with a flagrant violation and a matched mine in the comparison group. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors (shown in parentheses) are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table A.2. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, Final Action Date

	Injury rate	*Productivity*
Years 1 to 2	–0.675	–0.309
	(0.792)	(0.195)
Years 3 to 4	–1.182	–0.336
	(1.104)	(0.338)
Years 5 and after	–0.557	–0.836
	(1.319)	(0.596)
R^2	0.055	0.180
N	8,133	

Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: Period 0 is the quarter of the final action on the flagrant violation. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table A.3. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, by Mine Type

	Underground		*Surface*		*Facility*	
	Injury rate	*Productivity*	*Injury rate*	*Productivity*	*Injury rate*	*Productivity*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Years 1 to 2	–0.350	–0.277**	–0.587	–0.122	–1.373	0.114
	(0.682)	(0.123)	(0.734)	(0.290)	(0.125)	(0.236)
Years 3 to 4	–1.600**	–0.246	–0.091	–0.470	–2.809*	–0.585**
	(0.616)	(0.156)	(0.837)	(0.320)	(1.201)	(0.242)
Years 5 and after	–1.534*	–0.256	–0.132	–0.825	–2.278	–1.143*
	(0.923)	(0.291)	(1.048)	(0.884)	(1.321)	(0.595)
R^2	0.067	0.137	0.067	0.324	0.134	0.351
N	5,841		1,311		981	

Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: Column (1) and column (2) include underground mines. Column (3) and column (4) include surface mines. Column (5) and column (6) include preparation or milling facilities. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table A.4. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, by Mine Size

	Large		*Small*	
	Injury rate	*Productivity*	*Injury rate*	*Productivity*
	(1)	*(2)*	*(3)*	*(4)*
Years 1 to 2	–0.116	–0.262*	–0.141	–0.236*
	(0.470)	(0.152)	(0.901)	(0.133)
Years 3 to 4	–0.990*	–0.374*	–1.565*	–0.311*
	(0.520)	(0.204)	(0.812)	(0.169)
Years 5 and after	–0.656	–0.270	–2.576*	–0.407
	(0.684)	(0.350)	(1.319)	(0.385)
R^2	0.090	0.196	0.065	0.183
N	4,084		4,049	

Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: Column (1) and column (2) include mines with employment hours above the median, and column (3) and column (4) include those below the median. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table A.5. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, by Location

	KY and WV		*Others*	
	Injury rate	*Productivity*	*Injury rate*	*Productivity*
	(1)	*(2)*	*(3)*	*(4)*
Years 1 to 2	–0.190	–0.275***	–0.113	–0.172
	(0.693)	(0.083)	(0.828)	(0.235)
Years 3 to 4	–1.573**	–0.289**	–1.029	–0.326
	(0.628)	(0.120)	(0.790)	(0.250)
Years 5 and after	–2.053*	–0.006	–0.749	–0.760
	(1.120)	(0.236)	(0.859)	(0.474)
R^2	0.065	0.215	0.065	0.175
N	4,799		3,334	

Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: Column (1) and column (2) include mines in Kentucky (KY) and West Virginia (WV), and column (3) and column (4) include mines in other states. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

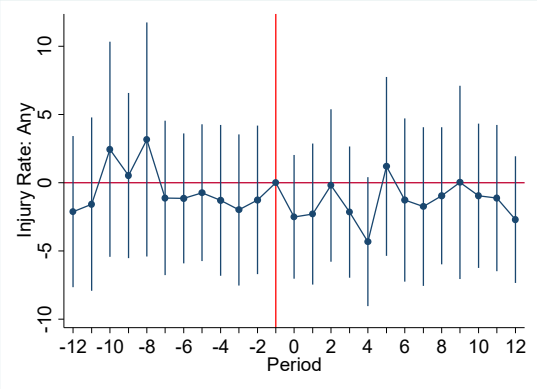
Table A.6. Effect of Flagrant Violations on Injury Rate and Productivity of Coal Mines, by Level of Penalty

	Penalty above median		*Penalty below median*	
	Injury rate	*Productivity*	*Injury rate*	*Productivity*
	(1)	*(2)*	*(3)*	*(4)*
Years 1 to 2	–0.359	–0.285*	–0.169	–0.227
	(1.502)	(0.146)	(0.575)	(0.137)
Years 3 to 4	–2.197**	–0.330*	–0.843	–0.319*
	(0.991)	(0.165)	(0.514)	(0.190)
Years 5 and after	–2.452*	–0.383	–0.559	–0.198
	(1.456)	(0.340)	(0.741)	(0.355)
R^2	0.083	0.215	0.053	0.176
N	3,088		5,045	

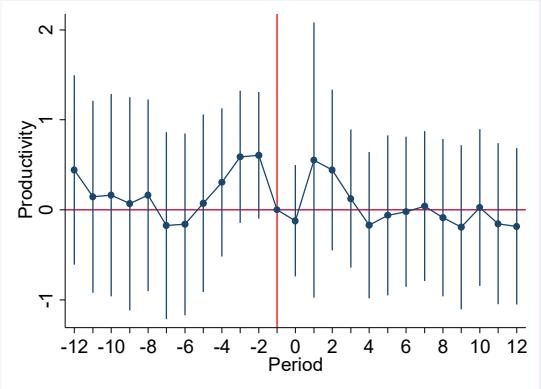
Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: Column (1) and column (2) include mines with a penalty above the median during the quarter of flagrant violations, and column (3) and column (4) include those below the median. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The model includes mine fixed effects and calendar-quarter fixed effects. Standard errors are clustered at the mine level.
***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Figure A.1. Effect of Flagrant Violations on Safety and Productivity in Coal Mines, Alternative Comparison Group

Panel A: Injury rate



Panel B: Worker productivity



Source: Data are from the Mine Data Retrieval System (MDRS).
Notes: The sample includes the closest match to mines with flagrant violations and owned by the same parent company. Mines without any match within 10 kilometers that are owned by the same parent company are excluded. Period 0 indicates the calendar quarter of the flagrant violation. Injury rate is measured as the average number of cases per 100 full-time equivalent employees. Productivity is measured as the number of short tons of coal per employment hour. The dots show the estimates on the changes in dependent variable relative to period –1.The vertical lines show the 95% confidence intervals, with the standard error clustered at the mine level.