Online Appendix for "A Ban on One Is a Boon for the Other: Strict Gasoline Content Rules and Implicit Ethanol Blending Mandates"

Soren Anderson*
Michigan State University
NBER

Andrew Elzinga†
Brown University

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*Email: sta@msu.edu. Web address: http://www.msu.edu/∼sta.
†Email: andrew_elzinga@brown.edu.

Table 1: Robustness results: conventional gasoline price levels (dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ban	0.007	-0.001	0.024	0.014	0.005	-0.003	0.001	0.003
	(0.011)	(0.013)	(0.011)	(0.014)	(0.012)	(0.011)	(0.012)	(0.013)
$ban \times p_{oil}$	-0.041	-0.030	-0.013	-0.012	-0.002	-0.077	-0.036	0.012
	(0.040)	(0.038)	(0.038)	(0.037)	(0.041)	(0.042)	(0.050)	(0.047)
$ban \times p_{ethanol}$	0.034	0.035	0.024	0.028	0.034	0.018	0.008	0.002
	(0.017)	(0.017)	(0.015)	(0.015)	(0.017)	(0.019)	(0.022)	(0.020)
$ban \times p_{mtbe}$	-0.057	-0.057	-0.053	-0.053	-0.084	-0.029	-0.040	-0.038
	(0.025)	(0.026)	(0.022)	(0.022)	(0.025)	(0.025)	(0.028)	(0.025)
$ban \times mw$	0.002	-0.007	-0.026	-0.029	-0.003	0.004	-0.002	-0.020
	(0.011)	(0.015)	(0.013)	(0.015)	(0.012)	(0.011)	(0.014)	(0.015)
$ban \times mw \times p_{oil}$	-0.051	-0.019	-0.049	-0.020	-0.006	-0.016	-0.004	-0.053
	(0.025)	(0.025)	(0.023)	(0.024)	(0.033)	(0.028)	(0.035)	(0.040)
$ban \times mw \times p_{ethanol}$	-0.021	-0.021	-0.023	-0.026	-0.018	-0.017	-0.007	-0.017
	(0.010)	(0.010)	(0.011)	(0.011)	(0.014)	(0.012)	(0.016)	(0.016)
$ban \times mw \times p_{mtbe}$	0.077	0.075	0.082	0.080	0.059	0.049	0.045	0.045
	(0.021)	(0.023)	(0.018)	(0.019)	(0.030)	(0.022)	(0.033)	(0.031)
$enact$					0.004		-0.002	0.000
					(0.009)		(0.010)	(0.013)
$enact \times p_{oil}$					-0.066		-0.073	-0.094
					(0.028)		(0.063)	(0.057)
$enact \times p_{ethanol}$					-0.002		0.010	0.008
					(0.014)		(0.026)	(0.022)
$enact \times p_{mtbe}$					0.046		0.027	0.016
					(0.019)		(0.033)	(0.031)
$enact \times mw$					0.008		0.007	0.026
					(0.010)		(0.010)	(0.016)
$enact \times mw \times p_{oil}$					-0.023		-0.013	0.109
					(0.037)		(0.037)	(0.041)
$enact \times mw \times p_{ethanol}$					-0.004		-0.012	-0.002
					(0.017)		(0.018)	(0.015)
$enact \times mw \times p_{mtbe}$					0.004		0.005	0.007
					(0.028)		(0.028)	(0.027)
State Quad. Trends		X		X				X
PADD-Year FEs			X	X				X
Enactment Dates					X		X	X
Banned-Month FEs						X	X	X
Observations		6,527	6,527	6,527	6,527	6,527	6,527	6,527

Note: Dependent variable is the average real price of conventional gasoline in a given state and month in real 2009 dollars. All regressions control for month (e.g., November 2004) and state-calendar month fixed effects (e.g., Massachusetts-March), as well as the additional controls specified for each column. Column (1) reproduces our preferred specification from the main text. Standard errors in parentheses are robust to serial correlation and heteroskedasticity (Newey-West standard errors with a seven-month lag).

Table 2: Robustness results: reformulated gasoline price levels (dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ban	0.059	0.046	0.041	0.026	0.049	0.052	0.047	0.029
	(0.015)	(0.014)	(0.012)	(0.012)	(0.016)	(0.017)	(0.020)	(0.013)
$ban \times p_{oil}$	-0.003	-0.006	0.052	0.046	0.045	0.040	0.137	0.131
	(0.060)	(0.056)	(0.055)	(0.058)	(0.063)	(0.068)	(0.070)	(0.066)
$ban \times p_{ethanol}$	0.003	0.002	0.009	0.011	-0.003	0.018	-0.024	-0.008
	(0.020)	(0.019)	(0.018)	(0.019)	(0.021)	(0.025)	(0.025)	(0.028)
$ban \times p_{mtbe}$	-0.078	-0.077	-0.091	-0.091	-0.083	-0.079	-0.089	-0.109
	(0.023)	(0.025)	(0.021)	(0.022)	(0.025)	(0.025)	(0.024)	(0.023)
$ban \times mw$	-0.048	-0.037	-0.052	-0.022	-0.049	-0.059	-0.055	-0.040
	(0.017)	(0.021)	(0.021)	(0.020)	(0.019)	(0.018)	(0.022)	(0.022)
$ban \times mw \times p_{oil}$	0.013	0.020	0.020	0.020	-0.179	0.037	-0.160	-0.221
	(0.031)	(0.033)	(0.035)	(0.038)	(0.094)	(0.035)	(0.107)	(0.100)
$ban \times mw \times p_{ethanol}$	-0.044	-0.051	-0.052	-0.057	0.036	-0.038	0.079	0.034
	(0.015)	(0.014)	(0.018)	(0.017)	(0.030)	(0.016)	(0.037)	(0.035)
$ban \times mw \times p_{mtbe}$	0.072	0.072	0.073	0.074	0.127	0.066	0.097	0.144
	(0.015)	(0.026)	(0.026)	(0.026)	(0.039)	(0.026)	(0.044)	(0.040)
$enact$					0.013		0.013	-0.018
					(0.011)		(0.014)	(0.011)
$enact \times p_{oil}$					-0.030		0.043	0.064
					(0.023)		(0.061)	(0.051)
$enact \times p_{ethanol}$					-0.008		0.013	0.015
					(0.013)		(0.027)	(0.025)
$enact \times p_{mtbe}$					0.000		-0.048	-0.033
					(0.015)		(0.034)	(0.033)
$enact \times mw$					-0.004		-0.007	0.053
					(0.014)		(0.016)	(0.021)
$enact \times mw \times p_{oil}$					0.207		0.198	0.279
					(0.091)		(0.101)	(0.093)
$enact \times mw \times p_{ethanol}$					-0.078		-0.115	-0.086
					(0.027)		(0.033)	(0.031)
$enact \times mw \times p_{mtbe}$					-0.057		-0.031	-0.072
					(0.030)		(0.035)	(0.031)
State Quad. Trends		X		X				X
PADD-Year FEs			X	X				X
Enactment Dates					X		X	X
Banned-Month FEs						X	X	X
Observations	2,684	2,684	2,684	2,684	2,684	2,684	2,684	2,684

Note: Dependent variable is the average real price of reformulated gasoline in a given state and month in real 2009 dollars. All regressions control for month (e.g., November 2004) and state-calendar month fixed effects (e.g., Massachusetts-March), as well as the additional controls specified for each column. Column (1) reproduces our preferred specification from the main text. Standard errors in parentheses are robust to serial correlation and heteroskedasticity (Newey-West standard errors with a seven-month lag).

Table 3: Robustness results: policy leads (dollars)

	(1)	(2)	(3)	(4)	(5)	(6)
ban	0.059	0.049	0.056	0.046	0.046	0.047
	(0.015)	(0.019)	(0.017)	(0.018)	(0.017)	(0.019)
$ban \times p_{oil}$	-0.003	0.011	0.004	0.014	0.024	0.001
	(0.060)	(0.060)	(0.063)	(0.061)	(0.062)	(0.061)
$ban \times p_{ethanol}$	0.003	0.006	0.004	0.011	0.004	0.006
	(0.020)	(0.021)	(0.020)	(0.021)	(0.020)	(0.021)
$ban \times p_{mtbe}$	-0.078	-0.083	-0.080	-0.079	-0.076	-0.064
	(0.023)	(0.024)	(0.025)	(0.023)	(0.023)	(0.026)
$ban \times mw$	-0.048	-0.049	-0.048	-0.049	-0.049	-0.048
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
$ban \times mw \times p_{oil}$	0.013	0.013	0.013	0.014	0.014	0.013
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.030)
$ban \times mw \times p_{ethanol}$	-0.044	-0.044	-0.044	-0.043	-0.044	-0.043
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
$ban \times mw \times p_{mtbe}$	0.072	0.072	0.071	0.071	0.071	0.072
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
3-*month lead of ban*		0.011				0.012
		(0.014)				(0.015)
6-*month lead of ban*			0.003			-0.030
			(0.012)			(0.017)
9-*month lead of ban*				0.016		0.013
				(0.013)		(0.015)
12-*month lead of ban*					0.020	0.022
					(0.013)	(0.016)
Observations	2,684	2,684	2,684	2,684	2,684	2,684
P-value	–	0.425	0.781	0.204	0.123	0.283

Note: Dependent variable is the average real price of reformulated gasoline in a given state and month in real 2009 dollars. All regressions control for month (e.g., November 2004) and state-calendar month fixed effects (e.g., Massachusetts-March). Column (1) reproduces our preferred specification from the main text. Standard errors in parentheses are robust to serial correlation and heteroskedasticity (Newey-West standard errors with a seven-month lag). P-value in the bottom row is the Wald test P-value for the null hypothesis that the coefficients on any "lead" variables are jointly zero.

Table 4: Late bans: gasoline price levels (dollars)

Coefficient	Conventional gasoline				Reformulated gasoline			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ban	0.013	0.015	0.006	0.007	0.013	0.018	0.044	0.059
	(0.007)	(0.009)	(0.006)	(0.017)	(0.010)	(0.011)	(0.014)	(0.015)
$ban \times p_{oil}$			-0.084	-0.044			-0.041	-0.002
			(0.034)	(0.041)			(0.058)	(0.060)
$ban \times p_{ethanol}$			0.020	0.035			-0.012	0.003
			(0.013)	(0.017)			(0.019)	(0.020)
$ban \times p_{mtbe}$			0.003	-0.057			-0.037	-0.078
			(0.015)	(0.026)			(0.018)	(0.023)
$ban \times mw$		-0.003		0.002		-0.013		-0.050
		(0.007)		(0.011)		(0.010)		(0.017)
$ban \times mw \times p_{oil}$				-0.047				0.015
				(0.026)				(0.032)
$ban \times mw \times p_{ethanol}$				-0.023				-0.044
				(0.010)				(0.015)
$ban \times mw \times p_{mtbe}$				0.077				0.072
				(0.022)				(0.025)
lateban	0.024	0.023	-0.006	-0.006	-0.007	-0.010	-0.044	-0.057
	(0.009)	(0.010)	(0.022)	(0.023)	(0.009)	(0.009)	(0.028)	(0.028)
$lateban \times p_{oil}$			0.041	0.024			0.019	0.023
			(0.029)	(0.031)			(0.037)	(0.038)
$lateban \times p_{ethanol}$			0.014	0.005			-0.001	-0.016
			(0.032)	(0.032)			(0.035)	(0.034)
$lateban \times p_{mtbe}$			-0.021	0.008			0.015	0.038
			(0.038)	(0.039)			(0.046)	(0.044)
Observations	7225	7225	6527	6527	2971	2971	2684	2684
P-value	0.006	0.016	0.117	0.080	0.435	0.251	0.439	0.157

Note: This table reports results for the "late" state MTBE bans that took effect subsequent to the nationwide ban in May 2006. Dependent variable is the average real price of gasoline (either conventional or reformulated) in a given state and month in real 2010 dollars. All regressions control for month (e.g., November 2004) and state-calendar month (e.g., Massachusetts-March) fixed effects. Standard errors in parentheses are robust to serial correlation and heteroskedasticity (Newey-West standard errors with a seven-month lag). P-value in the bottom row is the Wald test P-value for the null hypothesis that the coefficients on all *lateban* variables are jointly zero.

Table 5: Late bans: gasoline price first differences (dollars)

Coefficient	Conventional gasoline		Reformulated gasoline	
	(1)	(2)	(3)	(4)
$ban \times \Delta p_{oil}$	0.098	0.006	-0.035	-0.074
	(0.042)	(0.045)	(0.088)	(0.084)
$ban \times \Delta p_{ethanol}$	-0.011	0.045	-0.050	0.008
	(0.015)	(0.018)	(0.029)	(0.027)
$ban \times \Delta p_{mtbe}$	0.029	-0.088	-0.056	-0.122
	(0.016)	(0.018)	(0.025)	(0.024)
$ban \times mw \times \Delta p_{oil}$		0.138		0.081
		(0.031)		(0.054)
$ban \times mw \times \Delta p_{ethanol}$		-0.079		-0.151
		(0.014)		(0.021)
$ban \times mw \times \Delta p_{mtbe}$		0.153		0.159
		(0.014)		(0.024)
$lateban$	0.006	0.006	0.008	0.009
	(0.006)	(0.006)	(0.005)	(0.005)
$lateban \times \Delta p_{oil}$	-0.025	0.025	-0.040	-0.017
	(0.071)	(0.073)	(0.053)	(0.055)
$lateban \times \Delta p_{ethanol}$	0.102	0.071	0.102	0.057
	(0.039)	(0.038)	(0.037)	(0.035)
$lateban \times \Delta p_{mtbe}$	-0.020	0.037	-0.026	0.023
	(0.031)	(0.030)	(0.032)	(0.030)
Observations	6454	6454	2657	2657
P-value	0.046	0.000	0.013	0.016

Note: This table reports results for the "late" state MTBE bans that took effect subsequent to the nationwide ban in May 2006. Dependent variable is the monthly change in the average real price of gasoline (either conventional or reformulated) in a given state and month in real 2010 dollars. All regressions control for month (e.g., November 2004) and state-calendar month (e.g., Massachusetts-March) fixed effects. Standard errors in parentheses are robust to serial correlation and heteroskedasticity (Newey-West standard errors with a six-month lag). P-value in the bottom row is the Wald test P-value for the null hypothesis that the coefficients on all *lateban* variables are jointly zero.