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Appendix to “Joint Ventures and Technology Adoption: A Chinese Industrial Policy that Backfired”

Table A1: China’s Fuel Economy Standards

Curb Mass (CM), kg	Phase I: 2005-06		Phase II: 2008-09	
	General	Special Structure	General	Special Structure
CM ≤ 750	7.2	7.6	6.2	6.6
750 < CM ≤ 865	7.2	7.6	6.5	6.9
865 < CM ≤ 980	7.7	8.2	7.0	7.4
980 < CM ≤ 1,090	8.3	8.8	7.5	8.0
1,090 < CM ≤ 1,205	8.9	9.4	8.1	8.6
1,205 < CM ≤ 1,320	9.5	10.1	8.6	9.1
1,320 < CM ≤ 1,430	10.1	10.7	9.2	9.8
1,430 < CM ≤ 1,540	10.7	11.3	9.7	10.3
1,540 < CM ≤ 1,660	11.3	12.0	10.2	10.8
1,660 < CM ≤ 1,770	11.9	12.6	10.7	11.3
1,770 < CM ≤ 1,880	12.4	13.1	11.1	11.8
1,880 < CM ≤ 2,000	12.8	13.6	11.5	12.2
2,000 < CM ≤ 2,110	13.2	14.0	11.9	12.6
2,110 < CM ≤ 2,280	13.7	14.5	12.3	13.0
2,280 < CM ≤ 2,510	14.6	15.5	13.1	13.9
2,510 < CM	15.5	16.4	13.9	14.7

Note: Special structure vehicles are either a) automatic transmission; b) 3 or more rows of seats c) are SUVs. General type vehicles are all other manual transmission passenger vehicles.

Note: This table shows China’s fuel economy standards by curb weight class (CM=curb mass), in liters per 100 kilometers. Source: Zhao et al. (2010).

Table A2: Characteristic Correlation Matrix

	Sales volume	Torque	Horsepower	Weight	Height	Length
Price	-0.13	0.51	0.54	0.67	0.02	0.58
Sales volume	1.00	-0.12	-0.12	-0.14	0.00	-0.06
Torque		1.00	0.96	0.54	0.12	0.45
Horsepower			1.00	0.51	0.05	0.46
Weight				1.00	0.40	0.79
Height					1.00	0.02
Length						1.00

*Note:* This table shows correlations between characteristics (at the model-year level).  
Units are as in Table 1.

Table A3: Model-Level Summary Statistics by Domestic Firm Type

	Price (RMB)*	Sales Volume	Sales-Wtd Price (RMB)	Sales-Wtd Price (\$)	Torque <sup>†</sup>	Normalized Torque <sup>††</sup>	Weight (kg)	Height (mm)	Length (mm)	RCL Qual- ity
<i>Panel 1: Private domestic firms with JVs</i>										
Mean	95534	16934	84607	10774	152	3.62	1371	1538	4559	-.063
Median	89600	10871	79438	11736	151	3.50	1390	1460	4648	.11
Std Dev	42865	19933	36484	4643	39	0.85	268	183	356	1.18
N	79	82	82	75	64	70	60	63	63	63
<i>Panel 2: State-owned domestic firms with JVs</i>										
Mean	79338	39019	70857	9032	134	3.57	1215	1628	4243	.041
Median	65900	9957	61819	7882	133	3.00	1170	1550	4308	-.066
Std Dev	45962	105596	42110	5875	45	1.89	279	189	462	1.42
N	424	456	451	390	321	314	303	311	312	308
<i>Panel 3: State-owned domestic firms (SOEs)</i>										
Mean	77188	33907	70346	8966	136	3.46	1231	1614	4239	.20
Median	65800	11760	61355	8168	136	3.11	1180	1530	4310	.22
Std Dev	43552	84265	37081	5314	43	1.63	275	221	462	1.38
N	761	797	795	726	614	597	579	598	599	591
<i>Panel 4: Private domestic firms</i>										
Mean	80888	24671	75501	10540	151	4.01	1312	1568	4406	.30
Median	69800	10049	70545	10157	145	3.53	1220	1485	4533	.21
Std Dev	44822	35732	36650	4999	46	1.93	310	165	411	1.28
N	469	486	484	454	401	409	376	401	401	396
<i>Panel 5: All domestic firms</i>										
Mean	78515	30533	72315	9567	142	3.68	1262	1594	4307	.25
Median	67850	10880	64932	8866	140	3.29	1205	1495	4393	.22
Std Dev	43928	69926	36855	5224	45	1.77	291	201	448	1.34
N	1242	1295	1291	1192	1027	1018	964	1011	1012	999

*Note:* This table shows summary statistics at the model-year level. \*Nominal RMB. †Maximum torque, in nanometers. †† Torque specified at a particular speed, or rotations per minute (rpm). More power at lower speed is better, so lower RPM is better.

Table A4: Parallel Trends among Foreign and Domestic Firms prior to the Policy, 1999-2008

<i>Panel 1: Domestic vs. Foreign</i>				
Dep. Variable:	Log Torque	Log Price	Weight	RCL Quality
	I.	II.	III.	IV.
$Year_t \cdot Domestic_j$	.0015 (.017)	-.0073 (.016)	-.82 (10)	.061 (.049)
$Year_t$	.017** (.008)	-.019* (.0099)	8.5 (7.2)	.086** (.038)
Firm f.e.	Y	Y	Y	Y
N	1001	1026	985	991
$R^2$	0.06	0.35	0.04	0.069
<i>Panel 2: JV vs. non-JV (within Domestic)</i>				
	I.	II.	III.	IV.
$Year_t \cdot Has JV_j$	-.016 (.024)	-.018 (.026)	-6.3 (13)	-.0056 (.071)
$Year_t$	.023 (.023)	-.02 (.019)	8.8 (11)	.15*** (.027)
Firm f.e.	Y	Y	Y	Y
N	333	336	312	321
$R^2$	.01	.01	.01	0.044
<i>Panel 3: SOE vs. Private (within Domestic)</i>				
	I.	II.	III.	IV.
$Year_t \cdot SOE_j$	-.035 (.028)	-.035 (.028)	-15 (16)	-.021 (.06)
$Year_t$	.037 (.023)	-.0063 (.026)	15 (14)	.16*** (.04)
Firm f.e.	Y	Y	Y	Y
N	333	336	312	321
$R^2$	.04	.01	.03	0.039

*Note:* This table reports tests of whether the model characteristics of foreign and domestic firms were on different growth paths prior to the 2009 fuel economy policy. Specifications are variants of Equation 8. Standard errors are robust and clustered by firm. \*\*\* indicates  $p < .01$ .

Table A5: Parallel Trends among Foreign and Domestic Firms prior to the Policy with Year Effects, 1999-2008

Dep. Variable:	$X_j = \text{Domestic}_j$				$X_j = \text{Domestic w/ } JV_j$			
	Log Torque	Log Price	Weight	RCL Quality	Log Torque	Log Price	Weight	RCL Quality
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Year <sub>2006</sub> · $X_j$	0 (.)	-.004 (.06)	0 (.)	.26 (.19)	.029 (.14)	.09 (.067)	-23 (66)	.44* (.25)
Year <sub>2007</sub> · $X_j$	-.0045 (.036)	0 (.)	-25 (31)	0 (.)	.0091 (.16)	0 (.)	-36 (68)	0 (.)
Year <sub>2008</sub> · $X_j$	-.028 (.046)	.023 (.06)	-23 (37)	.11 (.17)	.028 (.14)	.11 (.078)	-50 (59)	.12 (.25)
Year <sub>2009</sub> · $X_j$	-.12** (.061)	-.06 (.053)	-59 (42)	-.27 (.19)	-.095 (.12)	-.0079 (.07)	-94* (51)	-.33 (.26)
Year <sub>2010</sub> · $X_j$	-.11 (.07)	-.072 (.062)	-75* (44)	-.36* (.21)	-.06 (.12)	-.054 (.076)	-89* (51)	-.53* (.31)
Year <sub>2011</sub> · $X_j$	-.097 (.068)	-.13* (.074)	-78* (44)	-.53** (.24)	-.078 (.12)	-.13 (.1)	-108** (51)	-.67** (.32)
Year <sub>2012</sub> · $X_j$	-.11 (.072)	-.13* (.078)	-56 (50)	-.39* (.23)	-.076 (.12)	-.075 (.1)	-64 (53)	-.44 (.3)
Year <sub>2013</sub> · $X_j$	-.11 (.073)	-.07 (.089)	-101* (56)	-.18 (.27)	-.073 (.12)	-.04 (.11)	-124** (54)	.0021 (.33)
Year f.e.	Y	Y	Y	Y	Y	Y	Y	Y
Firm f.e.	Y	Y	Y	Y	Y	Y	Y	Y
N	2350	2378	2284	2336	2338	2366	2275	2324
$R^2$	0.09	0.34	0.04	0.11	0.024	0.12	0.026	0.075

*Note:* This table reports tests of whether the model characteristics of foreign and domestic firms were on different growth paths prior to the 2009 fuel economy policy. Specifications are variants of Equation 8. Standard errors are robust and clustered by firm. \*\*\* indicates  $p < .01$ .

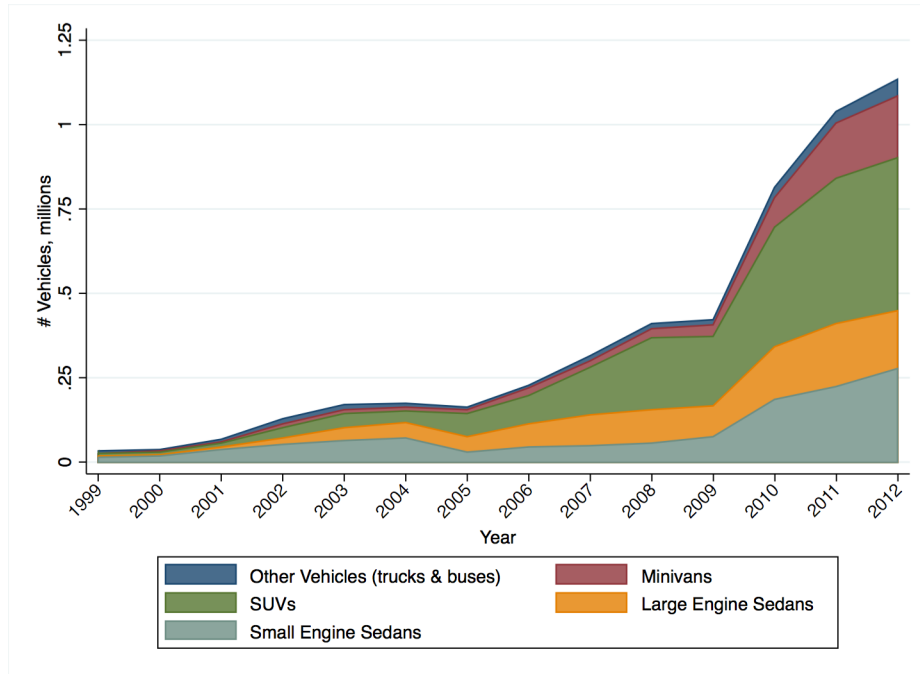


Figure A1: China Light Duty Vehicle Imports

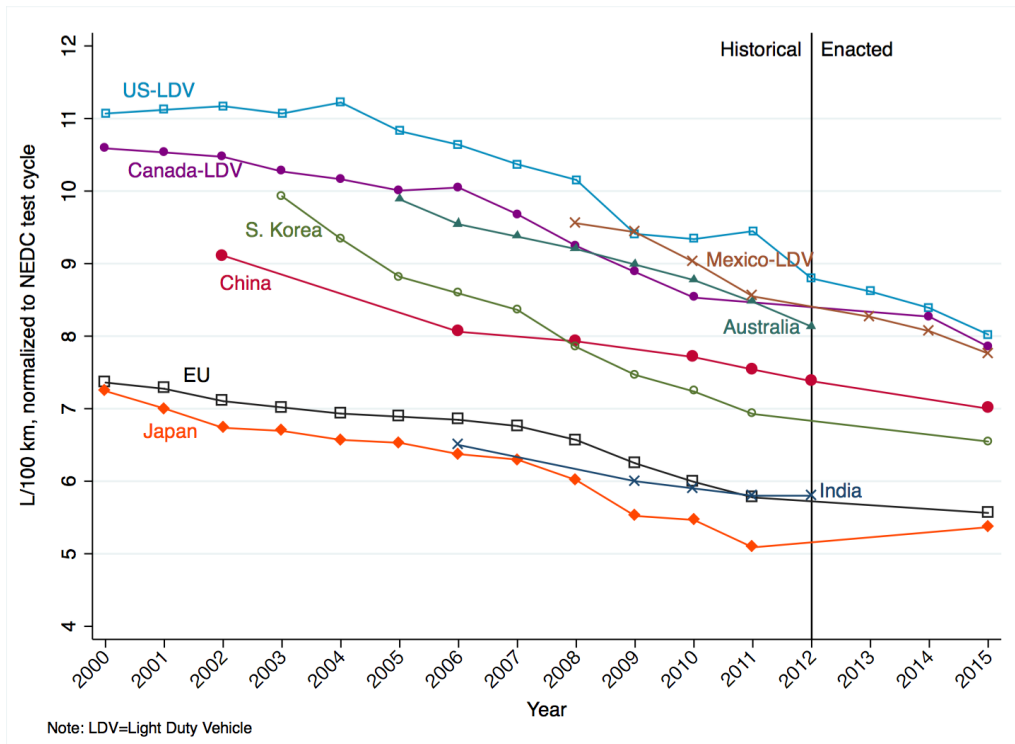


Figure A2: Fuel Economy Standards by Country, 2000-2015

Note: This figure shows historical and enacted fuel economy standards by country, in liters of gasoline per kilometer. Data from ICET (2013).

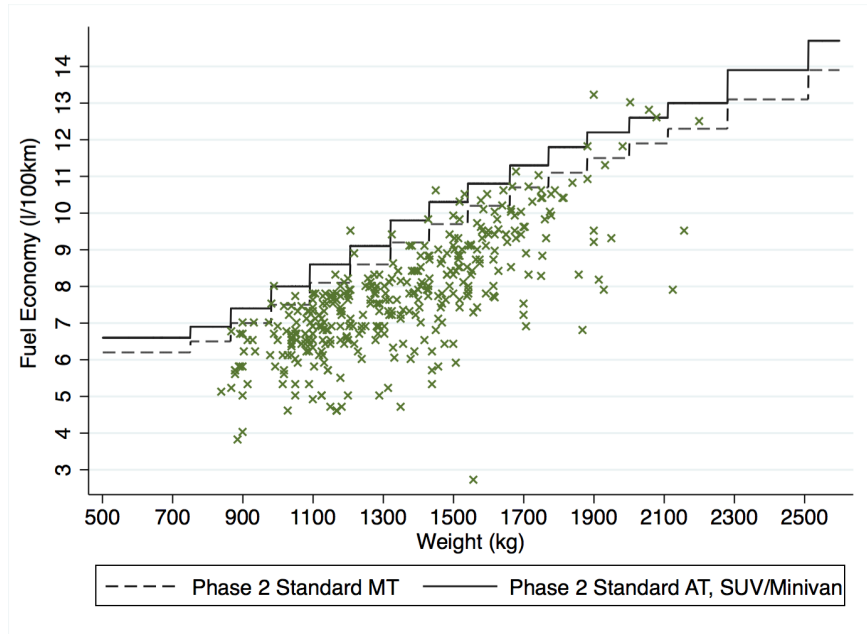


Figure A3: Model Fuel Economy and Weight, with Phase 2 Standards, 2010  
*Note:* This figure shows China's 2009 Phase 2 fuel economy standards. Dotted line is for manual transmission, line is for automatic and all SUVs/minivans.

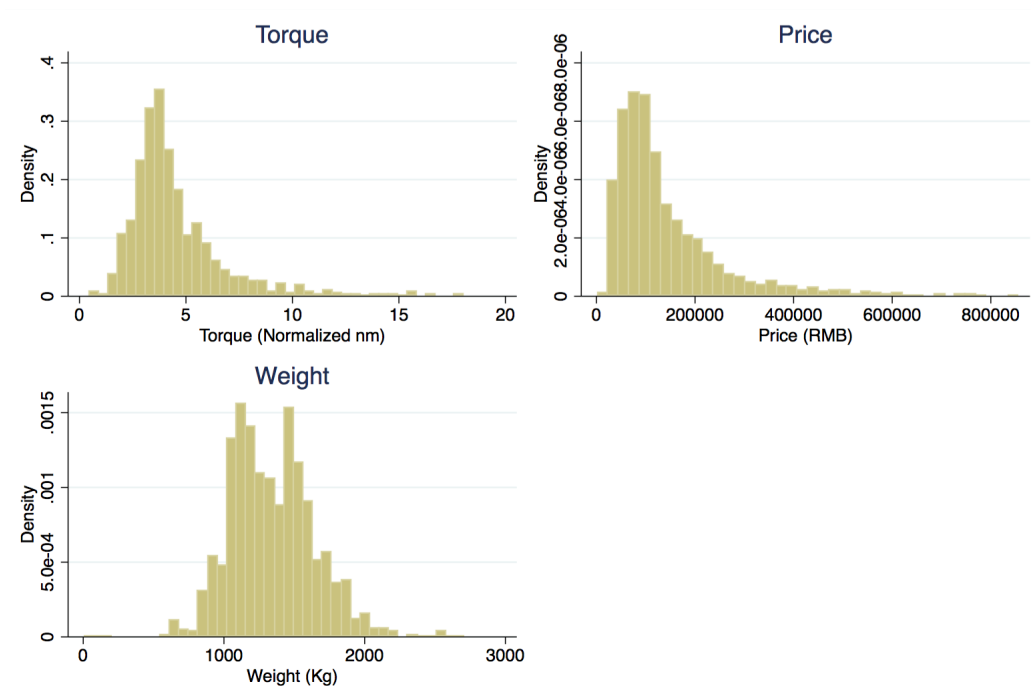


Figure A4: Characteristic Densities  
*Note:* This figure shows the densities of torque, weight, and price. Each observation is a new model-year.