

Online Appendix of  
**“From One to Many Central Plans:  
Drug Advertising Inspections and Intra-National  
Protectionism in China”**

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## Appendix

### Two Examples of Public Disclosure

In 2007 “Fei Xiao Tong Chang” cough syrup was disclosed for exaggerated advertisements in the city of Suzhou. The Bureau for Industry and Commerce in Suzhou forced its manufacturer to stop the advertisement immediately as well as to pay a fine of 7,500 yuan (at the time around US\$1,000); see <http://www.bsqgsj.gov.cn/baweb/show/shiju/bawebFile/3411.html>. In a more serious case in 2013, an advertiser in Zhejiang Province was fined 122,679 yuan (at the time around US\$20,000) for “misleading content in advertisement” of its drug to treat arthritis-related diseases; see [http://news.xinhuanet.com/health/2013-04/25/c\\_124630444.htm](http://news.xinhuanet.com/health/2013-04/25/c_124630444.htm). It should be noted that fines for illegal advertisement in China never appear to have been set under a nationwide standard and that in practice different local FDAs and related authorities enjoy a great degree of discretion when it comes to specific cases; see, for instance, the recent rules set by Sichuan Province, [http://opinion.chengdu.cn/topic/2014-10/14/content\\_1563916.htm?node=12023](http://opinion.chengdu.cn/topic/2014-10/14/content_1563916.htm?node=12023).

### Additional Tables and Figures

**Table A1.** Numbers of Firms — 31-Province Sample

Year	ASIE	ADVERTS	Matched ASIE-ADVERTS
2001	3,486	175	137
2002	3,680	449	316
2003	4,062	221	162
2004	4,709	214	174
2005	4,969	328	270
Total	7,883	796	653

**Table A2.** Numbers of Local and Nonlocal Firms Disclosed for “Illegal” Advertising  
— 31-Province Sample

Province	(1)			(2)	(3)	(4)	(5)
	Local	Non-local	All	% local firms in disclosed	% province's firms in country	% province's employment in country	Difference (2)-(3)
Ningxia	0	28	28	0.00	0.20	0.28	-0.20
Qinghai	2	46	48	4.17	0.33	0.29	3.84
Tibet	0	5	5	0.00	0.34	0.13	-0.34
Xinjiang	0	83	83	0.00	0.50	0.26	-0.50
Hainan	1	97	98	1.02	1.07	0.51	-0.05
Gansu	4	97	101	3.96	1.10	1.03	2.86
Inner Mongolia <sup>†</sup>	1	128	129	0.78	1.10	1.15	-0.33
Chongqing	1	86	87	1.15	1.25	1.91	-0.10
Fujian	2	105	107	1.87	1.76	1.55	0.11
Yunnan	4	78	82	4.88	1.86	1.39	3.02
Shanxi	7	79	86	8.14	2.10	2.14	6.04
Heilongjiang	5	140	145	3.45	2.11	3.85	1.34
Guizhou	3	103	106	2.83	2.40	1.66	0.43
Tianjin	5	67	72	6.94	2.46	3.36	4.48
Anhui	0	135	135	0.00	2.63	2.38	-2.63
Guangxi	0	93	93	0.00	2.96	2.59	-2.96
Jiangxi	1	124	125	0.80	2.99	3.48	-2.19
Hunan	2	109	111	1.80	3.33	2.29	-1.53
Liaoning	8	104	112	7.14	3.58	3.09	3.56
Shaanxi	7	74	81	8.64	3.61	3.09	5.03
Beijing	1	64	65	1.54	3.85	3.08	-2.31
Hebei	0	103	103	0.00	3.88	6.43	-3.88
Jilin	13	85	98	13.27	4.56	3.83	8.71
Shanghai	4	60	64	6.25	4.67	4.50	1.58
Sichuan	4	142	146	2.74	4.95	4.80	-2.21
Hubei	7	135	142	4.93	5.15	5.39	-0.22
Henan	2	66	68	2.94	5.24	6.26	-2.30
Guangdong	5	90	95	5.26	6.60	6.13	-1.34
Shandong	8	187	195	4.10	6.98	8.52	-2.88
Zhejiang <sup>†</sup>	0	134	134	0.00	8.07	6.87	-8.07
Jiangsu <sup>†</sup>	6	173	179	3.35	8.36	7.75	-5.00

Note. Provinces are ordered by their proportions of pharmaceutical firms in the country. <sup>†</sup>Provinces contained in our regression sample.

**Table A3.** Numbers of Licensed and Unlicensed Firms Disclosed — Three-Province Sample

Year	Jiangsu disclosed				Jiangsu undisclosed	
	Licensed		Unlicensed		Licensed	
	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	0	0	6	0	68	65
2002	9	0	28	0	66	71
2003	9	2	24	0	79	75
2004	26	5	58	0	81	99
2005	15	2	66	1	85	102
<b>Total</b>	59	9	182	1	379	412

  

Year	Zhejiang disclosed				Zhejiang undisclosed	
	Licensed		Unlicensed		Licensed	
	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	1	0	7	0	169	40
2002	13	0	16	0	178	40
2003	16	0	10	0	208	41
2004	19	0	14	0	220	47
2005	31	0	40	0	213	44
<b>Total</b>	80	0	87	0	988	212

  

Year	Inner Mongolia disclosed				Inner Mongolia undisclosed	
	Licensed		Unlicensed		Licensed	
	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	3	0	14	0	91	14
2002	6	0	15	0	105	14
2003	23	0	18	0	110	18
2004	34	1	18	0	135	23
2005	38	0	12	0	127	25
<b>Total</b>	104	1	77	0	568	94

  

Year	Three provinces disclosed				Three provinces undisclosed	
	Licensed		Unlicensed		Licensed	
	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
<b>Total</b>	243	10	346	1	1,935	718

Note. The sample here is made up of all 569 licensed firms in the three provinces, comprising 2,906 observations.

**Table A4.** Descriptive Statistics: 31-Province Sample versus Three-Province Sample

Variable	31-province sample			Three-province sample		
	Mean	SD	N	Mean	SD	N
<b>Firm size, productivity, and advertising variables:</b>						
Log sales	9.96	1.44	20,489	10.82	1.47	2,206
Lagged log sales	10.07	1.37	12,526	10.85	1.44	1,622
Log employment	4.90	1.10	20,715	5.58	0.99	2,210
Log sales per employee	5.04	1.06	20,475	5.23	0.96	2,205
Log advertisement expenditure <sup>†</sup>	5.06	6.25	16,840	9.03	6.87	1,773
Ratio of advertisement expenditure to sales	0.02	0.36	16,500	0.04	0.08	1,766
<b>Affiliation type:</b>						
Affiliation to central government			377			40
Affiliation to provincial government			1,865			345
Other affiliation types			18,664			1,830
<b>license type:</b>						
Licensed for advertising in Jiangsu						859
Licensed for advertising in Zhejiang						1,280
Licensed for advertising in Inner Mongolia						767
<b>Disclosure type:</b>						
Not disclosed			19,847			2,017
Disclosed in local province			37			10
Disclosed in nonlocal province			935			188
Disclosed in both local and nonlocal province			87			0
Disclosed in any province before			1,090			166

Note. This table presents summary statistics of the full sample and the three-province sample (Jiangsu, Zhejiang, and Inner Mongolia). “Mean”, “SD”, and “N” indicate mean value, standard deviation, and number of observations. <sup>†</sup> Adjusted for zeros by adding one yuan to the original value.

**Table A5. Disclosure Patterns — Two-Province Sample**

	LHS: indicator of a firm being disclosed							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal	0.082*** (0.012)	0.070*** (0.011)	0.083*** (0.013)	0.082*** (0.013)	0.109*** (0.026)	0.106*** (0.025)	0.092*** (0.018)	0.193*** (0.055)
Ratio of nonlocal (lagged)					-0.032 (0.028)			
Nonlocal×Ratio of nonlocal (lagged)					-0.008 (0.005)			
Ad expenditure						0.003*** (0.001)		
Nonlocal×Ad expenditure						-0.002 (0.002)		
Ad intensity							0.272** (0.134)	0.143 (0.092)
Nonlocal×Ad intensity							-0.189 (0.189)	-0.137 (0.125)
Labor productivity								0.001 (0.005)
Nonlocal×Labor productivity								-0.022** (0.009)
Sales (lagged)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Previously disclosed	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No	Yes	No	No	No
Market dummies	No	No	Yes	No	Yes	No	No	No
Market-year dummies	No	No	No	Yes	No	Yes	Yes	Yes
# Firms	472	443	443	443	443	439	438	472
# Observations	2,139	1,586	1,586	1,586	1,586	1,214	1,212	1,704
Adj. $R^2$	0.043	0.118	0.121	0.125	0.122	0.138	0.137	0.131

Note. This table reports regression results of the linear probability models on the determinants of disclosure in “illegal” drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu and/or Zhejiang. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the other variables are the same as in the previous tables. Standard errors (in parentheses) are clustered at the firm-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels respectively.

**Table A6.** Time-Varying Disclosure Patterns — Three-Province Sample

	LHS: indicator of a firm being disclosed							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal	0.013** (0.006)	0.084*** (0.018)	0.081*** (0.018)	0.084*** (0.019)	0.074*** (0.027)	0.103*** (0.030)	0.102*** (0.026)	0.223*** (0.075)
2002	0.002* (0.001)	-0.014 (0.009)	-0.014 (0.009)	-0.013 (0.009)	-0.024* (0.014)	-0.040*** (0.016)		
2003	0.009 (0.008)							
2004	0.022** (0.011)	0.008 (0.008)	0.006 (0.009)	0.005 (0.009)	0.019 (0.014)		0.040** (0.015)	0.038** (0.016)
2005	0.009 (0.007)	-0.003 (0.003)	-0.008 (0.005)	-0.011* (0.005)	-0.018 (0.012)	-0.035** (0.016)	0.004 (0.008)	0.001 (0.008)
Nonlocal×2002	0.059*** (0.016)					-0.000 (0.030)	-0.002 (0.030)	-0.004 (0.030)
Nonlocal×2003	0.085*** (0.018)	0.006 (0.019)	-0.014 (0.022)	-0.014 (0.022)	-0.022 (0.025)			
Nonlocal×2004	0.120*** (0.023)	0.061** (0.027)	0.023 (0.028)	0.025 (0.028)	0.001 (0.033)			
Nonlocal×2005	0.140*** (0.021)	0.062*** (0.024)	0.002 (0.025)	0.005 (0.025)	0.006 (0.027)	0.009 (0.027)	0.006 (0.027)	0.008 (0.027)
Ratio of nonlocal (lagged)	No	No	No	No	Yes	No	No	No
Nonlocal×Ratio of nonlocal (lagged)	No	No	No	No	Yes	No	No	No
Ad expenditure	No	No	No	No	No	Yes	No	No
Nonlocal×Ad expenditure	No	No	No	No	No	Yes	No	No
Ad intensity	No	No	No	No	No	No	Yes	Yes
Nonlocal×Ad intensity	No	No	No	No	No	No	Yes	Yes
Labor productivity	No	No	No	No	No	No	No	Yes
Nonlocal×Labor productivity	No	No	No	No	No	No	No	Yes
Sales (lagged)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Previously disclosed	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market dummies	No	No	No	Yes	Yes	Yes	Yes	Yes
# Firms	569	531	531	531	531	526	523	523
# Observations	2,906	2,140	2,140	2,140	2,140	1,647	1,644	1,644
Adj. $R^2$	0.051	0.045	0.127	0.133	0.131	0.138	0.136	0.138

Note. This table reports regression results of the linear probability models on the determinants of disclosure in “illegal” drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the other variables are the same as in the previous tables, except the introduction of the interactions between year dummies (with 2001 as the committed base) and the nonlocal dummy. Standard errors (in parentheses) are clustered at the firm-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels respectively.

**Table A7.** Market-Varying Disclosure Patterns — Three-Province Sample

	LHS: indicator of a firm being disclosed						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Nonlocal	0.156*** (0.017)	0.185*** (0.021)	0.135*** (0.016)	0.065 (0.157)	0.133*** (0.027)	0.137*** (0.023)	0.243*** (0.067)
Jiangsu	0.026*** (0.010)	0.034*** (0.013)	0.024** (0.010)	-0.118 (0.104)	0.032* (0.017)	0.029* (0.017)	0.026 (0.016)
Zhejiang	0.011** (0.004)	0.014** (0.007)	0.010 (0.007)	-0.072 (0.059)	-0.004 (0.016)	0.003 (0.015)	-0.004 (0.015)
Nonlocal×Jiangsu	-0.038 (0.024)	-0.045 (0.029)	-0.039* (0.023)	0.022 (0.141)	-0.024 (0.034)	-0.022 (0.035)	-0.018 (0.035)
Nonlocal×Zhejiang	-0.082*** (0.016)	-0.095*** (0.020)	-0.072*** (0.016)	-0.037 (0.081)	-0.058** (0.025)	-0.066*** (0.025)	-0.058** (0.025)
Ratio of nonlocal (lagged)	No	No	No	Yes	No	No	No
Nonlocal×Ratio of nonlocal (lagged)	No	No	No	Yes	No	No	No
Ad expenditure	No	No	No	No	Yes	No	No
Nonlocal×Ad expenditure	No	No	No	No	Yes	No	No
Ad intensity	No	No	No	No	No	Yes	Yes
Nonlocal×Ad intensity	No	No	No	No	No	Yes	Yes
Labor productivity	No	No	No	No	No	No	Yes
Nonlocal×Labor productivity	No	No	No	No	No	No	Yes
Sales (lagged)	No	Yes	Yes	Yes	Yes	Yes	Yes
Previously disclosed	No	No	Yes	Yes	Yes	Yes	Yes
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Firms	569	531	531	531	526	523	523
# Observations	2,906	2,140	2,140	2,140	1647	1644	1644
Adj. $R^2$	0.057	0.055	0.134	0.133	0.139	0.137	0.139

Note. This table reports regression results of the linear probability models on the determinants of disclosure in “illegal” drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the other variables are the same as in the previous tables, except the introduction of the interactions between market dummies (with Inner Mongolia as the committed base) and the nonlocal dummy. Standard errors (in parentheses) are clustered at the firm-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels respectively.

**Table A8.** Numbers of Firms by Location and Affiliation Type —  
Three-Province Sample

Location	Government affiliation				Total
	None	Lower	Province	Central	
<b>Baseline sample:</b>					
Local	101	523	28	10	662
Nonlocal	250	1,495	449	50	2,244
Total	351	2,018	477	60	2,906
<b>Reduced sample:</b>					
Local	59	401	22	8	490
Nonlocal	162	1,110	338	40	1,650
Total	221	1,511	360	48	2,140

Note. This table reports the number of firms in all rows. “Baseline sample” indicates the statistics for the models where lagged values are not included, while “Reduced sample” indicates the statistics for the models estimated where lagged values are included.

## Investigating the bias from selective disclosure between licensed and unlicensed firms

As a first indication, it can be seen from Table A3 that virtually all (346/347=99.7%) of the disclosed firms who got caught for unlicensed advertising were from outside the region. Given the fact that in reality some local firms may also engage in unlicensed advertising, this figure shows an extremely strong bias against nonlocal advertisers when local FDAs deal with unlicensed advertising activities. As a result, even if unlicensed advertising firms were included in our analysis, the discrimination effect would probably only be stronger than it is currently estimated.

Second, we run placebo tests on expanded samples where all pharmaceutical producers in 31 provinces are included. In Panel A of Table A9, we apply the same specifications as in Table 2 on an enlarged sample of firm-province-year combinations by assuming that each firm advertises in the three provinces of Jiangsu, Zhejiang, and Inner Mongolia. As expected, the discrimination effect is now much lower (0.5%-0.74%) but is positive and statistically significant in most specifications. In Panel B, using the same set of explanatory variables we resort to the bivariate probit model with the dependent variable in the additional equation (unreported) being a dummy for whether the firm was granted a license in one of the three provinces in a given year. The assumption is that every firm applies for licenses and advertises in the three provinces and the determination mechanism for licensing is the same as that for disclosure. The estimated marginal effect of being a nonlocal firm indicates a significantly positive discrimination effect, larger than our results Panel A but smaller than the baseline estimates in Table 2 of the main paper. In Panel C, the sample is further expanded with an even more radical assumption that each firm advertises in all 31 provinces of the country. Not surprisingly, the estimated discrimination effect is further reduced to below 6% but remains significantly different from zero in most specifications. Since all three assumptions exaggerate the actual number of firms who advertise or apply for licenses in the data, the estimates could be easily driven downward to zero or even negative values. Nevertheless in fact the estimates are still mostly positive and significant (albeit of smaller sizes), which we then take as further supporting evidence for the existence of a discrimination effect.

**Table A9. Placebo Tests — Disclosure Patterns for 31-Province Sample**

LHS: indicator of a firm being disclosed								
<b>Panel A.</b> Linear probability model. Assumption: every firm advertises in the three provinces of Jiangsu, Zhejiang, and Inner Mongolia								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal	0.007*** (0.001)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.004 (0.005)	0.007*** (0.002)	0.005 (0.010)
# Firms	7,883	5,531	5,531	5,531	5,531	2,637	5,311	5,310
# Observations	62,718	37,578	37,578	37,578	37,578	13,170	28,683	28,677
Adj. $R^2$	0.002	0.087	0.087	0.087	0.087	0.092	0.097	0.097
<b>Panel B.</b> Bivariate probit model. Assumption: every firm advertises in the three provinces of Jiangsu, Zhejiang, and Inner Mongolia								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal	0.010*** (0.003)	0.009*** (0.003)	0.013*** (0.004)	0.012*** (0.004)	0.015*** (0.005)	0.033*** (0.015)	0.016*** (0.004)	-0.003 (0.022)
# Firms	7,883	5,531	5,531	5,531	5,531	2,637	5,311	5,310
# Observations	62,718	37,578	37,578	37,578	37,578	13,170	28,683	28,677
<b>Panel C.</b> Linear probability model. Assumption: every firm advertises in 31 provinces								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal	0.000 (0.001)	0.001 (0.001)	0.002** (0.001)	0.002** (0.001)	0.003*** (0.001)	0.006* (0.003)	0.002* (0.001)	-0.002 (0.005)
# Firms	7,883	5,531	5,531	5,531	5,531	2,637	5,311	5,310
# Observations	648,086	388,306	388,306	388,306	388,306	136,090	296,391	296,329
Adj. $R^2$	0.001	0.064	0.064	0.066	0.064	0.072	0.071	0.071
Ratio of nonlocal (lagged)	No	No	No	No	Yes	No	No	No
Nonlocal $\times$ Ratio of nonlocal (lagged)	No	No	No	No	Yes	No	No	No
Ad expenditure	No	No	No	No	No	Yes	No	No
Nonlocal $\times$ Ad expenditure	No	No	No	No	No	Yes	No	No
Ad intensity	No	No	No	No	No	No	Yes	Yes
Nonlocal $\times$ Ad intensity	No	No	No	No	No	No	Yes	Yes
Labor productivity	No	No	No	No	No	No	No	Yes
Nonlocal $\times$ Labor productivity	No	No	No	No	No	No	No	Yes
Sales (lagged)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Previously disclosed	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No	Yes	No	No	No
Market dummies	No	No	Yes	No	Yes	No	No	No
Market-year dummies	No	No	No	Yes	No	Yes	Yes	Yes

Note. This table reports regression results for the determinants of disclosure in “illegal” drug advertising inspections for the sample of all firms in 31 provinces, under alternative assumptions on the advertising locations of these firms. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. “Ratio of nonlocal (lagged)” is now the ratio of the number of nonlocal firms to that of local firms in the provincial market, lagged one year, under the assumption that they all advertise in that market. Definitions of the other variables are the same as in the previous tables. Standard errors (in parentheses) are clustered at the firm-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels respectively.