On Anticompetitive Third-Degree Price Discrimination

Online Appendix

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Table O.A.1: Curvature Tests Summary: Beer

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	4.30	4.36	4.22	4.16	4.30	4.36	4.22	4.16
Std.Dev of estimated $\hat{\varepsilon}$	1.41	1.47	1.43	1.50	1.41	1.47	1.43	1.50
Chain-Products (surviving)	91.69	87.17	91.17	91.52	92.14	86.73	89.18	89.66
IRC holds for all stores in a chain	34.38	45.28	37.71	38.71	29.24	36.23	38.97	29.21
– Welfare decreases globally	8.85	14.17	10.80	12.07	2.68	4.67	6.95	3.76
– Welfare increases globally	12.60	16.53	14.34	13.13	4.90	8.93	10.33	4.23
Potential welfare increase								
– Output increases	28.75	31.11	29.14	29.05	15.34	17.26	24.29	14.80
– Output increases enough	23.85	28.19	24.95	22.97	10.13	14.40	19.09	8.86
Potential welfare decrease								
– Output decreases	18.85	23.06	20.48	21.14	7.48	8.99	15.25	9.31
– Output does not increase enough	70.94	69.31	70.86	72.97	86.97	83.68	76.77	89.10

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.2: Descriptive Statistics: Beer

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–76
Price ($)					
Average Price	11.32	11.62	12.27	10.80	11.93
Standard Deviation	4.68	3.91	4.18	4.44	5.12
Maximum Price	23.86	19.60	20.89	22.87	23.86
Minimum Price	1.11	1.19	1.47	1.11	1.19
Supermarket Stores					
Average Number of UPCs	9.3	6.7	3.9	9.9	10.8
Average Weekly Sales (units)	118.5	77.3	46.6	121.7	148.4
Average Weekly Sales ($)	1,456.86	951.56	629.86	1,392.59	1,972.84
Supermarket Chains					
Average Number of Stores	12.5	3.4	8.4	15.1	38.8
Average Number of UPCs	18.8	8.1	9.8	26.1	39.4
Average Weekly Sales (units)	1,459.3	245.3	374.6	1,802.9	5,653.9
Average Weekly Sales ($)	17,944.00	3,018.19	5,058.62	20,629.87	75,155.61
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	1.57	1.06	1.96	1.53	1.88
Maximum Coefficient of Variation	16.39	6.32	8.29	16.39	12.41
Minimum Coefficient of Variation	0.00	0.00	0.00	0.00	0.01
Overall Data					
Total Number of Chains	51	17	8	21	5
Total Number of Stores	636	57	67	318	194
Total Number of UPCs	109	41	42	93	91
Total Sales (millions of units)	15.1	0.8	0.6	7.8	5.9
Total Sales ($ millions)	185.3	10.0	8.4	88.7	78.2
Average Number of Weeks	195.5	185.0	189.3	197.0	195.9
Observations (millions)	1.15	0.07	0.05	0.62	0.41

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.3: Store Demand Curvature: Beer – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	5,896	2,369	1,781	553	1,193
Sales ($ millions)	185.33	58.91	55.67	21.65	49.10
Average $\hat{\varepsilon}$	4.30	3.93	4.73	4.24	4.44
Std.Dev. $\hat{\varepsilon}$	1.41	1.57	1.23	1.23	1.17

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.4: Chain Size and Curvature Conditions: Beer – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,047	874	173	201.1	82.5	118.6
Chain-Products, $x(p^u) > 0$		960	810	150	185.3	76.6	108.7
IRC holds for all stores in a chain		330	306	24	54.2	27.5	26.7
– Welfare decreases globally		85	85	0	5.0	5.0	0.0
– Welfare increases globally		121	119	2	9.1	6.9	2.1
Potential welfare increase							
– Output increases		276	260	16	28.4	16.5	11.9
– Output increases enough		229	221	8	18.8	12.9	5.9
Potential welfare decrease:							
– Output decreases:		181	178	3	13.9	12.3	1.5
– Output does not increase enough		681	541	140	161.2	58.6	102.6
Chains (%)							
IRC holds for all stores in a chain		34.38	37.78	16.00	29.24	35.87	24.56
– Welfare decreases globally		8.85	10.49	0.00	2.68	6.49	0.00
– Welfare increases globally		12.60	14.69	1.33	4.90	9.05	1.97
Potential welfare increase							
– Output increases		28.75	32.10	10.67	15.34	21.57	10.96
– Output increases enough		23.85	27.28	5.33	10.13	16.86	5.39
Potential welfare decrease:							
– Output decreases:		18.85	21.98	2.00	7.48	16.08	1.42
– Output does not increase enough		70.94	66.79	93.33	86.97	76.46	94.37

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.5: Store Demand Curvature: Beer – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	3,846	2,127	879	225	615
Sales ($ millions)	118.29	57.61	30.37	8.09	22.22
Average $\hat{\varepsilon}$	4.36	4.06	4.76	4.35	4.83
Std.Dev. $\hat{\varepsilon}$	1.47	1.55	1.31	1.28	1.22

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.6: Chain Size and Curvature Conditions: Beer – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		826	731	95	136.4	69.2	67.1
Chain-Products, $x(p^u) > 0$		720	642	78	118.3	62.1	56.2
IRC holds for all stores in a chain		326	318	8	42.9	30.9	11.9
– Welfare decreases globally		102	102	0	5.5	5.5	0.0
– Welfare increases globally		119	119	0	10.6	10.6	0.0
Potential welfare increase							
– Output increases		224	220	4	20.4	18.1	2.3
– Output increases enough		203	202	1	17.0	16.9	0.1
Potential welfare decrease:							
– Output decreases:		166	164	2	10.6	10.3	0.3
– Output does not increase enough		499	424	75	99.0	44.1	54.8
Chains (%)							
IRC holds for all stores in a chain		45.28	49.53	10.26	36.23	49.85	21.19
– Welfare decreases globally		14.17	15.89	0.00	4.67	8.89	0.00
– Welfare increases globally		16.53	18.54	0.00	8.93	17.01	0.00
Potential welfare increase							
– Output increases		31.11	34.27	5.13	17.26	29.14	4.13
– Output increases enough		28.19	31.46	1.28	14.40	27.21	0.25
Potential welfare decrease:							
– Output decreases:		23.06	25.55	2.56	8.99	16.63	0.54
– Output does not increase enough		69.31	66.04	96.15	83.68	71.10	97.56

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.7: Store Demand Curvature: Beer – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	6,340	2,704	1,731	535	1,370
Sales ($ millions)	191.16	65.00	51.24	19.76	55.16
Average $\hat{\varepsilon}$	4.22	3.81	4.64	4.31	4.48
Std.Dev. $\hat{\varepsilon}$	1.43	1.54	1.30	1.23	1.19

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.8: Chain Size and Curvature Conditions: Beer – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,178	996	182	214.4	96.2	118.1
Chain-Products, $x(p^u) > 0$		1,074	919	155	191.2	90.8	100.4
IRC holds for all stores in a chain		405	385	20	53.6	35.4	18.2
– Welfare decreases globally		116	116	0	6.3	6.3	0.0
– Welfare increases globally		154	154	0	9.4	9.4	0.0
Potential welfare increase							
– Output increases		313	296	17	29.7	22.1	7.7
– Output increases enough		268	255	13	22.3	17.3	5.0
Potential welfare decrease:							
– Output decreases:		220	216	4	15.9	13.8	2.1
– Output does not increase enough		761	621	140	164.8	69.7	95.1
Chains (%)							
IRC holds for all stores in a chain		37.71	41.89	12.90	28.02	38.97	18.11
– Welfare decreases globally		10.80	12.62	0.00	3.30	6.95	0.00
– Welfare increases globally		14.34	16.76	0.00	4.90	10.33	0.00
Potential welfare increase							
– Output increases		29.14	32.21	10.97	15.55	24.29	7.65
– Output increases enough		24.95	27.75	8.39	11.66	19.09	4.94
Potential welfare decrease:							
– Output decreases:		20.48	23.50	2.58	8.33	15.25	2.07
– Output does not increase enough		70.86	67.57	90.32	86.21	76.77	94.74

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.9: Store Demand Curvature: Beer – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	5,638	2,506	1,572	458	1,102
Sales ($ millions)	166.43	60.97	46.64	15.47	43.36
Average $\hat{\varepsilon}$	4.16	3.75	4.64	4.16	4.40
Std.Dev. $\hat{\varepsilon}$	1.50	1.58	1.38	1.32	1.26

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.10: Chain Size and Curvature Conditions: Beer – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,132	994	138	185.6	100.5	85.0
Chain-Products, $x(p^u) > 0$		1,036	922	114	166.4	94.9	71.5
IRC holds for all stores in a chain		401	385	16	48.6	35.4	13.2
– Welfare decreases globally		125	125	0	6.3	6.3	0.0
– Welfare increases globally		136	136	0	7.0	7.0	0.0
Potential welfare increase							
– Output increases		301	294	7	24.6	21.1	3.6
– Output increases enough		238	235	3	14.7	14.2	0.6
Potential welfare decrease:							
– Output decreases:		219	218	1	15.5	15.3	0.2
– Output does not increase enough		756	647	109	148.3	77.9	70.4
Chains (%)							
IRC holds for all stores in a chain		38.71	41.76	14.04	29.21	37.29	18.50
– Welfare decreases globally		12.07	13.56	0.00	3.76	6.59	0.00
– Welfare increases globally		13.13	14.75	0.00	4.23	7.41	0.00
Potential welfare increase							
– Output increases		29.05	31.89	6.14	14.80	22.21	4.98
– Output increases enough		22.97	25.49	2.63	8.86	14.92	0.80
Potential welfare decrease:							
– Output decreases:		21.14	23.64	0.88	9.31	16.09	0.31
– Output does not increase enough		72.97	70.17	95.61	89.10	82.07	98.44

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.11: Curvature Tests Summary: Carbonated Beverages

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.31	3.38	3.29	3.35	3.31	3.38	3.29	3.35
Std.Dev of estimated $\hat{\varepsilon}$	1.25	1.32	1.27	1.35	1.25	1.32	1.27	1.35
Chain-Products (surviving)	95.15	91.37	96.04	96.15	92.53	86.34	93.76	93.70
IRC holds for all stores in a chain	35.55	49.53	35.89	37.36	38.32	51.90	38.79	40.06
– Welfare decreases globally	8.91	12.52	8.69	9.30	3.91	6.08	3.23	3.48
– Welfare increases globally	9.00	14.36	9.40	9.66	3.13	5.86	4.04	4.20
Potential welfare increase								
– Output increases	23.30	25.72	23.08	23.33	9.43	11.01	9.69	9.76
– Output increases enough	16.77	20.78	16.41	16.17	6.13	7.99	5.26	5.14
Potential welfare decrease								
– Output decreases	15.80	18.91	15.21	15.68	6.09	9.28	5.07	5.55
– Output does not increase enough	79.17	74.55	78.60	78.58	92.32	89.32	91.97	91.59

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.12: Descriptive Statistics: Carbonated Beverages

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–88
Price ($)					
Average Price	2.22	2.35	2.38	2.32	2.04
Standard Deviation	1.21	1.25	1.23	1.22	1.15
Maximum Price	6.00	5.21	5.27	6.00	5.23
Minimum Price	0.23	0.23	0.24	0.24	0.29
Supermarket Stores					
Average Number of UPCs	38.4	25.9	31.6	44.3	36.6
Average Weekly Sales (units)	1,438.2	992.8	1,159.1	1,523.8	1,503.1
Average Weekly Sales ($)	3,261.20	2,335.43	2,920.91	3,689.39	3,061.77
Supermarket Chains					
Average Number of Stores	13.6	3.1	8.1	15.7	34.9
Average Number of UPCs	67.9	31.6	59.4	91.0	90.7
Average Weekly Sales (units)	19,213.2	2,840.2	9,123.6	23,172.9	50,229.7
Average Weekly Sales ($)	43,568.20	6,681.11	22,990.59	56,105.18	102,316.33
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.51	2.57	2.37	2.35	2.94
Maximum Coefficient of Variation	25.18	17.43	25.18	15.87	13.40
Minimum Coefficient of Variation	0.00	0.02	0.00	0.00	0.08
Overall Data					
Total Number of Chains	71	19	16	25	11
Total Number of Stores	964	58	130	392	384
Total Number of UPCs	908	213	320	604	415
Total Sales (millions of units)	273.3	10.2	29.4	118.8	114.9
Total Sales ($ millions)	619.7	24.0	74.0	287.6	234.1
Average Number of Weeks	192.4	174.5	194.2	192.8	193.3
Observations (millions)	7.13	0.26	0.80	3.35	2.72

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.13: Store Demand Curvature: Carb. Bevs. – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	37,049	11,776	14,208	5,401	5,664
Sales ($ millions)	619.67	122.03	275.75	117.80	104.09
Average $\hat{\varepsilon}$	3.31	3.36	3.54	2.88	3.02
Std.Dev. $\hat{\varepsilon}$	1.25	1.51	1.15	0.92	0.98

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.14: Chain Size and Curvature Conditions: Carb. Bevs. – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		5,070	3,837	1,233	669.7	231.5	438.2
Chain-Products, $x(p^u) > 0$		4,824	3,686	1,138	619.7	222.5	397.2
IRC holds for all stores in a chain		1,715	1,458	257	237.5	96.6	140.9
– Welfare decreases globally		430	424	6	24.2	22.5	1.7
– Welfare increases globally		434	428	6	19.4	16.1	3.3
Potential welfare increase							
– Output increases		1,124	1,033	91	58.4	38.5	20.0
– Output increases enough		809	768	41	38.0	28.2	9.8
Potential welfare decrease:							
– Output decreases:		762	744	18	37.7	34.6	3.1
– Output does not increase enough		3,819	2,739	1,080	572.1	186.5	385.6
Chains (%)							
IRC holds for all stores in a chain		35.55	39.56	22.58	38.32	43.42	35.47
– Welfare decreases globally		8.91	11.50	0.53	3.91	10.10	0.44
– Welfare increases globally		9.00	11.61	0.53	3.13	7.24	0.83
Potential welfare increase							
– Output increases		23.30	28.02	8.00	9.43	17.28	5.03
– Output increases enough		16.77	20.84	3.60	6.13	12.67	2.46
Potential welfare decrease:							
– Output decreases:		15.80	20.18	1.58	6.09	15.58	0.77
– Output does not increase enough		79.17	74.31	94.90	92.32	83.83	97.07

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.15: Store Demand Curvature: Carb. Bevs. – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	25,039	12,136	6,278	2,535	4,090
Sales ($ millions)	424.66	145.98	131.61	55.67	91.40
Average $\hat{\varepsilon}$	3.38	3.33	3.52	3.10	3.53
Std.Dev. $\hat{\varepsilon}$	1.32	1.46	1.21	1.09	1.14

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.16: Chain Size and Curvature Conditions: Carb. Bevs. – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		4,404	3,701	703	491.9	221.4	270.5
Chain-Products, $x(p^u) > 0$		4,024	3,429	595	424.7	201.9	222.8
IRC holds for all stores in a chain		1,993	1,773	220	220.4	104.9	115.5
– Welfare decreases globally		504	491	13	25.8	21.3	4.5
– Welfare increases globally		578	572	6	24.9	20.9	3.9
Potential welfare increase							
– Output increases		1,035	997	38	46.8	39.9	6.9
– Output increases enough		836	815	21	33.9	30.3	3.6
Potential welfare decrease:							
– Output decreases:		761	738	23	39.4	29.7	9.7
– Output does not increase enough		3,000	2,433	567	379.3	164.1	215.2
Chains (%)							
IRC holds for all stores in a chain		49.53	51.71	36.97	51.90	51.96	51.83
– Welfare decreases globally		12.52	14.32	2.18	6.08	10.53	2.04
– Welfare increases globally		14.36	16.68	1.01	5.86	10.37	1.77
Potential welfare increase							
– Output increases		25.72	29.08	6.39	11.01	19.74	3.10
– Output increases enough		20.78	23.77	3.53	7.99	15.01	1.62
Potential welfare decrease:							
– Output decreases:		18.91	21.52	3.87	9.28	14.70	4.37
– Output does not increase enough		74.55	70.95	95.29	89.32	81.30	96.59

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4}(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.17: Store Demand Curvature: Carb. Bevs. – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	36,936	10,224	13,031	6,620	7,061
Sales ($ millions)	623.97	99.97	244.28	151.04	128.68
Average $\hat{\varepsilon}$	3.29	3.07	3.63	3.07	3.22
Std.Dev. $\hat{\varepsilon}$	1.27	1.45	1.29	0.97	1.02

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.18: Chain Size and Curvature Conditions: Carb. Bevs. – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		5,031	3,808	1,223	665.5	218.5	447.0
Chain-Products, $x(p^u) > 0$		4,832	3,694	1,138	624.0	208.1	415.9
IRC holds for all stores in a chain		1,734	1,475	259	242.1	99.3	142.8
– Welfare decreases globally		420	413	7	20.2	18.5	1.6
– Welfare increases globally		454	438	16	25.2	16.7	8.5
Potential welfare increase							
– Output increases		1,115	1,030	85	60.4	41.0	19.5
– Output increases enough		793	759	34	32.8	25.9	6.9
Potential welfare decrease:							
– Output decreases:		735	709	26	31.6	27.1	4.5
– Output does not increase enough		3,798	2,719	1,079	573.8	171.4	402.4
Chains (%)							
IRC holds for all stores in a chain		35.89	39.93	22.76	38.79	47.73	34.32
– Welfare decreases globally		8.69	11.18	0.62	3.23	8.90	0.40
– Welfare increases globally		9.40	11.86	1.41	4.04	8.01	2.05
Potential welfare increase							
– Output increases		23.08	27.88	7.47	9.69	19.69	4.68
– Output increases enough		16.41	20.55	2.99	5.26	12.46	1.66
Potential welfare decrease:							
– Output decreases:		15.21	19.19	2.28	5.07	13.03	1.08
– Output does not increase enough		78.60	73.61	94.82	91.97	82.38	96.76

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.19: Store Demand Curvature: Carb. Bevs. – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	32,875	10,339	11,336	4,897	6,303
Sales ($ millions)	555.89	118.71	213.55	100.72	122.91
Average $\hat{\varepsilon}$	3.35	3.09	3.72	3.10	3.33
Std.Dev. $\hat{\varepsilon}$	1.35	1.47	1.38	1.10	1.10

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.20: Chain Size and Curvature Conditions: Carb. Bevs. – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		4,908	3,939	969	593.3	238.4	354.9
Chain-Products, $x(p^u) > 0$		4,719	3,824	895	555.9	231.5	324.4
IRC holds for all stores in a chain		1,763	1,556	207	222.7	105.4	117.4
– Welfare decreases globally		439	434	5	19.3	18.2	1.1
– Welfare increases globally		456	444	12	23.4	18.7	4.7
Potential welfare increase							
– Output increases		1,101	1,045	56	54.3	44.5	9.8
– Output increases enough		763	738	25	28.6	25.3	3.3
Potential welfare decrease:							
– Output decreases:		740	722	18	30.8	26.8	4.0
– Output does not increase enough		3,708	2,860	848	509.2	193.3	315.8
Chains (%)							
IRC holds for all stores in a chain		37.36	40.69	23.13	40.06	45.51	36.18
– Welfare decreases globally		9.30	11.35	0.56	3.48	7.88	0.34
– Welfare increases globally		9.66	11.61	1.34	4.20	8.08	1.44
Potential welfare increase							
– Output increases		23.33	27.33	6.26	9.76	19.21	3.02
– Output increases enough		16.17	19.30	2.79	5.14	10.94	1.00
Potential welfare decrease:							
– Output decreases:		15.68	18.88	2.01	5.55	11.58	1.24
– Output does not increase enough		78.58	74.79	94.75	91.59	83.49	97.37

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.21: Curvature Tests Summary: Coffee

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.65	3.68	3.70	3.65	3.65	3.68	3.70	3.65
Std.Dev of estimated $\hat{\varepsilon}$	1.41	1.41	1.41	1.44	1.41	1.41	1.41	1.44
Chain-Products (surviving)	94.88	94.36	95.45	95.72	92.23	92.00	94.60	93.87
IRC holds for all stores in a chain	33.73	47.64	36.80	38.38	30.67	42.56	31.83	32.20
– Welfare decreases globally	7.93	10.14	7.84	10.84	2.97	4.50	1.29	2.94
– Welfare increases globally	7.08	12.32	7.84	9.47	1.97	5.01	1.64	4.13
Potential welfare increase								
– Output increases	20.07	23.37	21.64	22.03	6.95	11.52	11.45	13.36
– Output increases enough	14.84	19.93	14.82	16.35	3.49	9.02	5.69	9.25
Potential welfare decrease								
– Output decreases	15.51	15.22	14.31	16.35	5.85	4.72	3.37	5.17
– Output does not increase enough	82.12	77.36	81.09	77.80	95.16	89.71	92.91	87.17

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.22: Descriptive Statistics: Coffee

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–85
Price ($)					
Average Price	5.57	5.84	5.94	5.46	5.56
Standard Deviation	2.26	2.45	2.19	2.29	2.22
Maximum Price	14.58	14.58	11.58	14.58	11.37
Minimum Price	1.10	2.59	1.12	1.10	1.92
Supermarket Stores					
Average Number of UPCs	5.6	4.4	4.6	6.5	5.3
Average Weekly Sales (units)	60.3	45.6	39.7	67.8	61.3
Average Weekly Sales ($)	319.80	254.43	238.89	360.00	312.98
Supermarket Chains					
Average Number of Stores	13.6	3.1	8.1	15.3	34.3
Average Number of UPCs	9.1	5.2	7.6	11.9	10.9
Average Weekly Sales (units)	796.3	129.4	304.8	1,010.3	1,986.4
Average Weekly Sales ($)	4,225.31	721.01	1,835.05	5,363.99	10,149.32
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.37	2.45	2.27	2.28	2.69
Maximum Coefficient of Variation	22.65	9.96	22.65	9.30	15.76
Minimum Coefficient of Variation	0.00	0.01	0.00	0.01	0.19
Overall Data					
Total Number of Chains	65	15	16	24	10
Total Number of Stores	887	46	130	368	343
Total Number of UPCs	129	28	40	96	51
Total Sales (millions of units)	10.5	0.4	1.0	5.0	4.1
Total Sales ($ millions)	55.8	2.1	5.8	26.7	21.1
Average Number of Weeks	175.1	167.1	168.9	176.8	175.6
Observations (millions)	0.88	0.03	0.10	0.42	0.32

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.23: Store Demand Curvature: Coffee – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	5,011	1,054	2,378	660	919
Sales ($ millions)	55.82	7.54	30.50	6.79	11.00
Average $\hat{\varepsilon}$	3.65	2.74	4.21	3.27	3.53
Std.Dev. $\hat{\varepsilon}$	1.41	1.20	1.40	1.11	1.15

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.24: Chain Size and Curvature Conditions: Coffee – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		625	439	186	60.5	21.4	39.0
Chain-Products, $x(p^u) > 0$		593	426	167	55.8	20.1	35.7
IRC holds for all stores in a chain		200	156	44	17.1	7.4	9.7
– Welfare decreases globally		47	45	2	1.7	0.8	0.9
– Welfare increases globally		42	40	2	1.1	1.0	0.1
Potential welfare increase							
– Output increases		119	114	5	3.9	2.9	1.0
– Output increases enough		88	87	1	1.9	1.9	0.1
Potential welfare decrease:							
– Output decreases:		92	89	3	3.3	2.5	0.8
– Output does not increase enough		487	324	163	53.1	17.7	35.4
Chains (%)							
IRC holds for all stores in a chain		33.73	36.62	26.35	30.67	36.79	27.22
– Welfare decreases globally		7.93	10.56	1.20	2.97	3.88	2.45
– Welfare increases globally		7.08	9.39	1.20	1.97	4.84	0.35
Potential welfare increase							
– Output increases		20.07	26.76	2.99	6.95	14.52	2.69
– Output increases enough		14.84	20.42	0.60	3.49	9.20	0.26
Potential welfare decrease:							
– Output decreases:		15.51	20.89	1.80	5.85	12.30	2.21
– Output does not increase enough		82.12	76.06	97.60	95.16	87.94	99.23

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.25: Store Demand Curvature: Coffee – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	4,023	1,298	1,364	451	910
Sales ($ millions)	43.74	10.49	16.03	5.45	11.76
Average $\hat{\varepsilon}$	3.68	3.06	4.17	3.55	3.90
Std.Dev. $\hat{\varepsilon}$	1.41	1.38	1.40	1.22	1.22

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.26: Chain Size and Curvature Conditions: Coffee – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		585	455	130	47.5	20.7	26.8
Chain-Products, $x(p^u) > 0$		552	433	119	43.7	19.9	23.8
IRC holds for all stores in a chain		263	223	40	18.6	9.3	9.3
– Welfare decreases globally		56	55	1	2.0	1.1	0.9
– Welfare increases globally		68	67	1	2.2	2.2	0.0
Potential welfare increase							
– Output increases		129	119	10	5.0	3.9	1.1
– Output increases enough		110	105	5	3.9	3.4	0.6
Potential welfare decrease:							
– Output decreases:		84	82	2	2.1	1.7	0.4
– Output does not increase enough		427	314	113	39.2	16.1	23.1
Chains (%)							
IRC holds for all stores in a chain		47.64	51.50	33.61	42.56	46.62	39.17
– Welfare decreases globally		10.14	12.70	0.84	4.50	5.47	3.69
– Welfare increases globally		12.32	15.47	0.84	5.01	10.86	0.13
Potential welfare increase							
– Output increases		23.37	27.48	8.40	11.52	19.65	4.72
– Output increases enough		19.93	24.25	4.20	9.02	16.85	2.47
Potential welfare decrease:							
– Output decreases:		15.22	18.94	1.68	4.72	8.42	1.63
– Output does not increase enough		77.36	72.52	94.96	89.71	80.82	97.15

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.27: Store Demand Curvature: Coffee – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	4,871	1,048	2,086	662	1,075
Sales ($ millions)	56.10	7.47	26.97	7.63	14.02
Average $\hat{\varepsilon}$	3.70	2.74	4.26	3.50	3.69
Std.Dev. $\hat{\varepsilon}$	1.41	1.21	1.41	1.21	1.13

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.28: Chain Size and Curvature Conditions: Coffee – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		615	432	183	59.3	19.3	40.0
Chain-Products, $x(p^u) > 0$		587	418	169	56.1	18.7	37.4
IRC holds for all stores in a chain		216	173	43	17.9	8.0	9.9
– Welfare decreases globally		46	46	0	0.7	0.7	0.0
– Welfare increases globally		46	45	1	0.9	0.9	0.1
Potential welfare increase							
– Output increases		127	116	11	6.4	2.8	3.6
– Output increases enough		87	85	2	3.2	1.9	1.2
Potential welfare decrease:							
– Output decreases:		84	84	0	1.9	1.9	0.0
– Output does not increase enough		476	310	166	52.1	16.1	36.0
Chains (%)							
IRC holds for all stores in a chain		36.80	41.39	25.44	31.83	42.76	26.39
– Welfare decreases globally		7.84	11.00	0.00	1.29	3.89	0.00
– Welfare increases globally		7.84	10.77	0.59	1.64	4.63	0.14
Potential welfare increase							
– Output increases		21.64	27.75	6.51	11.45	15.07	9.65
– Output increases enough		14.82	20.33	1.18	5.69	10.43	3.32
Potential welfare decrease:							
– Output decreases:		14.31	20.10	0.00	3.37	10.14	0.00
– Output does not increase enough		81.09	74.16	98.22	92.91	86.36	96.17

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.29: Store Demand Curvature: Coffee – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	4,315	1,053	1,747	588	927
Sales ($ millions)	47.52	7.81	21.27	7.07	11.38
Average $\hat{\varepsilon}$	3.65	2.81	4.16	3.52	3.70
Std.Dev. $\hat{\varepsilon}$	1.44	1.29	1.44	1.29	1.22

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.30: Chain Size and Curvature Conditions: Coffee – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		607	463	144	50.6	22.4	28.2
Chain-Products, $x(p^u) > 0$		581	449	132	47.5	21.4	26.2
IRC holds for all stores in a chain		223	192	31	15.3	9.1	6.2
– Welfare decreases globally		63	62	1	1.4	1.2	0.2
– Welfare increases globally		55	53	2	2.0	1.6	0.3
Potential welfare increase							
– Output increases		128	120	8	6.3	4.1	2.2
– Output increases enough		95	92	3	4.4	3.0	1.4
Potential welfare decrease:							
– Output decreases:		95	91	4	2.5	1.9	0.5
– Output does not increase enough		452	326	126	41.4	17.1	24.4
Chains (%)							
IRC holds for all stores in a chain		38.38	42.76	23.48	32.20	42.70	23.64
– Welfare decreases globally		10.84	13.81	0.76	2.94	5.64	0.73
– Welfare increases globally		9.47	11.80	1.52	4.13	7.69	1.23
Potential welfare increase							
– Output increases		22.03	26.73	6.06	13.36	19.28	8.52
– Output increases enough		16.35	20.49	2.27	9.25	14.18	5.23
Potential welfare decrease:							
– Output decreases:		16.35	20.27	3.03	5.17	9.04	2.02
– Output does not increase enough		77.80	72.61	95.45	87.17	79.97	93.05

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.31: Curvature Tests Summary: Cold Cereal

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.64	3.59	3.64	3.63	3.64	3.59	3.64	3.63
Std.Dev of estimated $\hat{\varepsilon}$	1.38	1.43	1.39	1.44	1.38	1.43	1.39	1.44
Chain-Products (surviving)	91.48	86.11	94.61	93.13	88.28	84.26	92.91	90.45
IRC holds for all stores in a chain	41.45	52.61	45.00	44.71	37.51	41.81	42.34	41.12
– Welfare decreases globally	9.66	13.39	9.44	10.59	4.10	4.97	4.63	5.18
– Welfare increases globally	10.50	15.42	11.01	11.29	4.56	7.68	5.14	4.59
Potential welfare increase								
– Output increases	25.15	25.84	24.73	22.40	15.19	14.69	14.99	12.82
– Output increases enough	17.61	21.21	16.92	15.21	9.01	10.99	8.11	6.68
Potential welfare decrease								
– Output decreases	16.02	19.22	15.20	16.74	7.86	9.31	6.58	7.84
– Output does not increase enough	78.56	74.76	79.10	78.61	88.40	85.83	89.40	89.32

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.32: Descriptive Statistics: Cold Cereal

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–88
Price ($)					
Average Price	3.00	3.01	2.98	2.99	3.01
Standard Deviation	0.69	0.63	0.73	0.71	0.67
Maximum Price	7.60	5.42	5.90	7.60	7.47
Minimum Price	0.48	1.21	0.48	0.49	1.57
Supermarket Stores					
Average Number of UPCs	24.0	15.6	21.0	26.8	23.3
Average Weekly Sales (units)	381.1	250.4	306.8	414.2	388.5
Average Weekly Sales ($)	1,098.73	717.75	869.82	1,188.98	1,130.72
Supermarket Chains					
Average Number of Stores	13.6	3.1	8.1	15.6	34.9
Average Number of UPCs	45.8	19.5	38.5	62.6	63.1
Average Weekly Sales (units)	5,108.7	729.5	2,394.6	6,276.4	12,983.8
Average Weekly Sales ($)	14,730.13	2,090.86	6,788.05	18,018.11	37,789.19
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.66	2.43	2.41	2.57	3.19
Maximum Coefficient of Variation	18.75	18.58	15.73	18.75	14.14
Minimum Coefficient of Variation	0.01	0.04	0.01	0.01	0.06
Overall Data					
Total Number of Chains	70	19	15	25	11
Total Number of Stores	954	59	121	390	384
Total Number of UPCs	473	116	173	360	200
Total Sales (millions of units)	71.8	2.6	7.4	32.2	29.7
Total Sales ($ millions)	207.1	7.5	20.8	92.4	86.5
Average Number of Weeks	186.4	168.8	187.4	187.4	186.9
Observations (millions)	4.26	0.16	0.48	1.96	1.67

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.33: Store Demand Curvature: Cold Cereal – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	22,859	9,210	8,236	2,430	2,983
Sales ($ millions)	207.15	74.15	80.69	22.37	29.94
Average $\hat{\varepsilon}$	3.64	3.93	3.69	2.90	3.19
Std.Dev. $\hat{\varepsilon}$	1.38	1.59	1.21	0.99	1.04

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.34: Chain Size and Curvature Conditions: Cold Cereal – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,508	2,808	700	234.6	118.9	115.7
Chain-Products, $x(p^u) > 0$		3,209	2,614	595	207.1	108.8	98.3
IRC holds for all stores in a chain		1,330	1,168	162	77.7	47.3	30.4
– Welfare decreases globally		310	305	5	8.5	7.9	0.6
– Welfare increases globally		337	334	3	9.4	9.2	0.3
Potential welfare increase							
– Output increases		807	762	45	31.5	24.4	7.1
– Output increases enough		565	547	18	18.7	16.1	2.6
Potential welfare decrease:							
– Output decreases:		514	499	15	16.3	13.8	2.5
– Output does not increase enough		2,521	1,957	564	183.1	88.8	94.3
Chains (%)							
IRC holds for all stores in a chain		41.45	44.68	27.23	37.51	43.50	30.87
– Welfare decreases globally		9.66	11.67	0.84	4.10	7.25	0.61
– Welfare increases globally		10.50	12.78	0.50	4.56	8.41	0.29
Potential welfare increase							
– Output increases		25.15	29.15	7.56	15.19	22.43	7.18
– Output increases enough		17.61	20.93	3.03	9.01	14.79	2.61
Potential welfare decrease:							
– Output decreases:		16.02	19.09	2.52	7.86	12.70	2.50
– Output does not increase enough		78.56	74.87	94.79	88.40	81.58	95.94

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.35: Store Demand Curvature: Cold Cereal – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	16,622	9,451	3,735	1,163	2,273
Sales ($ millions)	160.63	90.67	36.33	11.46	22.17
Average $\hat{\varepsilon}$	3.59	3.49	3.84	3.30	3.76
Std.Dev. $\hat{\varepsilon}$	1.43	1.50	1.35	1.23	1.27

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.36: Chain Size and Curvature Conditions: Cold Cereal – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,088	2,606	482	190.6	103.9	86.7
Chain-Products, $x(p^u) > 0$		2,659	2,261	398	160.6	87.4	73.3
IRC holds for all stores in a chain		1,399	1,269	130	67.2	43.3	23.9
– Welfare decreases globally		356	353	3	8.0	7.6	0.4
– Welfare increases globally		410	401	9	12.3	10.1	2.3
Potential welfare increase							
– Output increases		687	658	29	23.6	18.1	5.5
– Output increases enough		564	546	18	17.7	13.5	4.1
Potential welfare decrease:							
– Output decreases:		511	500	11	14.9	13.2	1.7
– Output does not increase enough		1,988	1,616	372	137.9	69.7	68.2
Chains (%)							
IRC holds for all stores in a chain		52.61	56.13	32.66	41.81	49.53	32.61
– Welfare decreases globally		13.39	15.61	0.75	4.97	8.69	0.54
– Welfare increases globally		15.42	17.74	2.26	7.68	11.53	3.09
Potential welfare increase							
– Output increases		25.84	29.10	7.29	14.69	20.67	7.55
– Output increases enough		21.21	24.15	4.52	10.99	15.48	5.64
Potential welfare decrease:							
– Output decreases:		19.22	22.11	2.76	9.31	15.11	2.38
– Output does not increase enough		74.76	71.47	93.47	85.83	79.78	93.05

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.37: Store Demand Curvature: Cold Cereal – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	24,625	7,171	10,086	3,290	4,078
Sales ($ millions)	226.81	56.78	98.45	32.15	39.44
Average $\hat{\varepsilon}$	3.64	3.62	4.02	3.06	3.22
Std.Dev. $\hat{\varepsilon}$	1.39	1.62	1.36	0.95	0.98

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.38: Chain Size and Curvature Conditions: Cold Cereal – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,561	2,813	748	244.1	116.2	127.9
Chain-Products, $x(p^u) > 0$		3,369	2,693	676	226.8	110.3	116.5
IRC holds for all stores in a chain		1,516	1,301	215	96.0	52.8	43.2
– Welfare decreases globally		318	308	10	10.5	8.8	1.7
– Welfare increases globally		371	365	6	11.7	10.0	1.6
Potential welfare increase							
– Output increases		833	774	59	34.0	23.8	10.2
– Output increases enough		570	548	22	18.4	14.6	3.8
Potential welfare decrease:							
– Output decreases:		512	499	13	14.9	13.8	1.2
– Output does not increase enough		2,665	2,023	642	202.8	91.0	111.7
Chains (%)							
IRC holds for all stores in a chain		45.00	48.31	31.80	42.34	47.92	37.06
– Welfare decreases globally		9.44	11.44	1.48	4.63	7.95	1.50
– Welfare increases globally		11.01	13.55	0.89	5.14	9.09	1.41
Potential welfare increase							
– Output increases		24.73	28.74	8.73	14.99	21.62	8.72
– Output increases enough		16.92	20.35	3.25	8.11	13.23	3.27
Potential welfare decrease:							
– Output decreases:		15.20	18.53	1.92	6.58	12.49	1.00
– Output does not increase enough		79.10	75.12	94.97	89.40	82.55	95.89

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.39: Store Demand Curvature: Cold Cereal – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	21,547	7,271	8,151	2,509	3,616
Sales ($ millions)	198.78	58.85	79.34	24.36	36.23
Average $\hat{\varepsilon}$	3.63	3.54	4.01	3.05	3.35
Std.Dev. $\hat{\varepsilon}$	1.44	1.61	1.40	1.09	1.09

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.40: Chain Size and Curvature Conditions: Cold Cereal – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,509	2,920	589	219.8	124.8	95.0
Chain-Products, $x(p^u) > 0$		3,268	2,752	516	198.8	115.0	83.8
IRC holds for all stores in a chain		1,461	1,309	152	81.7	53.5	28.2
– Welfare decreases globally		346	337	9	10.3	8.9	1.4
– Welfare increases globally		369	368	1	9.1	9.1	0.1
Potential welfare increase							
– Output increases		732	699	33	25.5	20.6	4.9
– Output increases enough		497	489	8	13.3	12.5	0.8
Potential welfare decrease:							
– Output decreases:		547	531	16	15.6	13.8	1.8
– Output does not increase enough		2,569	2,072	497	177.5	95.7	81.9
Chains (%)							
IRC holds for all stores in a chain		44.71	47.57	29.46	41.12	46.52	33.70
– Welfare decreases globally		10.59	12.25	1.74	5.18	7.76	1.63
– Welfare increases globally		11.29	13.37	0.19	4.59	7.87	0.08
Potential welfare increase							
– Output increases		22.40	25.40	6.40	12.82	17.92	5.82
– Output increases enough		15.21	17.77	1.55	6.68	10.87	0.94
Potential welfare decrease:							
– Output decreases:		16.74	19.30	3.10	7.84	11.97	2.18
– Output does not increase enough		78.61	75.29	96.32	89.32	83.21	97.70

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.41: Curvature Tests Summary: Frozen Dinner

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.60	3.70	3.57	3.57	3.60	3.70	3.57	3.57
Std.Dev of estimated $\hat{\varepsilon}$	1.34	1.43	1.36	1.42	1.34	1.43	1.36	1.42
Chain-Products (surviving)	97.30	92.58	97.76	96.98	95.14	89.34	95.75	94.74
IRC holds for all stores in a chain	42.77	53.57	43.04	43.44	33.52	44.09	36.16	35.22
– Welfare decreases globally	10.20	14.03	9.84	10.30	4.12	6.31	3.53	4.10
– Welfare increases globally	11.52	15.03	11.10	11.74	4.33	7.34	3.96	5.17
Potential welfare increase								
– Output increases	25.45	25.73	23.60	24.89	12.85	14.99	11.82	12.48
– Output increases enough	18.64	21.05	17.78	18.21	7.68	10.88	7.22	7.94
Potential welfare decrease								
– Output decreases	15.99	18.80	15.95	16.09	7.18	8.88	7.11	7.60
– Output does not increase enough	77.77	74.23	78.27	76.55	90.39	85.46	90.54	88.64

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.42: Descriptive Statistics: Frozen Dinner

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–87
Price ($)					
Average Price	2.36	2.25	2.31	2.39	2.35
Standard Deviation	1.12	0.89	1.09	1.15	1.12
Maximum Price	12.31	6.97	11.81	12.31	12.28
Minimum Price	0.31	0.47	0.46	0.31	0.31
Supermarket Stores					
Average Number of UPCs	22.5	14.8	20.2	22.3	24.5
Average Weekly Sales (units)	283.5	176.1	211.5	280.7	322.2
Average Weekly Sales ($)	587.56	370.45	440.16	574.81	673.28
Supermarket Chains					
Average Number of Stores	13.7	2.9	7.9	15.5	34.8
Average Number of UPCs	42.8	16.9	37.1	52.6	70.5
Average Weekly Sales (units)	3,797.1	482.5	1,630.0	4,233.9	10,717.2
Average Weekly Sales ($)	7,868.22	1,014.96	3,391.86	8,670.31	22,397.24
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	1.98	1.86	1.70	1.86	2.42
Maximum Coefficient of Variation	31.03	9.65	11.07	8.67	31.03
Minimum Coefficient of Variation	0.00	0.01	0.01	0.00	0.04
Overall Data					
Total Number of Chains	69	18	15	25	11
Total Number of Stores	942	53	119	387	383
Total Number of UPCs	201	82	112	177	172
Total Sales (millions of units)	52.9	1.7	5.0	21.7	24.5
Total Sales ($ millions)	109.6	3.5	10.4	44.4	51.2
Average Number of Weeks	181.8	171.1	184.0	181.9	182.0
Observations (millions)	3.86	0.13	0.44	1.57	1.71

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.43: Store Demand Curvature: Frozen Dinner – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	21,228	6,426	8,649	2,598	3,555
Sales ($ millions)	109.60	31.85	46.29	13.41	18.06
Average $\hat{\varepsilon}$	3.60	3.61	3.83	3.10	3.39
Std.Dev. $\hat{\varepsilon}$	1.34	1.55	1.26	1.08	1.15

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.44: Chain Size and Curvature Conditions: Frozen Dinner – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,033	2,438	595	115.2	54.0	61.2
Chain-Products, $x(p^u) > 0$		2,951	2,390	561	109.6	52.5	57.1
IRC holds for all stores in a chain		1,262	1,117	145	36.7	22.5	14.3
– Welfare decreases globally		301	298	3	4.5	4.4	0.2
– Welfare increases globally		340	338	2	4.7	4.5	0.2
Potential welfare increase							
– Output increases		751	720	31	14.1	11.4	2.7
– Output increases enough		550	540	10	8.4	7.7	0.8
Potential welfare decrease:							
– Output decreases:		472	462	10	7.9	7.0	0.9
– Output does not increase enough		2,295	1,749	546	99.1	43.0	56.1
Chains (%)							
IRC holds for all stores in a chain		42.77	46.74	25.85	33.52	42.79	25.00
– Welfare decreases globally		10.20	12.47	0.53	4.12	8.31	0.28
– Welfare increases globally		11.52	14.14	0.36	4.33	8.67	0.35
Potential welfare increase							
– Output increases		25.45	30.13	5.53	12.85	21.67	4.75
– Output increases enough		18.64	22.59	1.78	7.68	14.59	1.33
Potential welfare decrease:							
– Output decreases:		15.99	19.33	1.78	7.18	13.32	1.53
– Output does not increase enough		77.77	73.18	97.33	90.39	81.94	98.15

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.45: Store Demand Curvature: Frozen Dinner – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	13,946	7,450	3,287	1,112	2,097
Sales ($ millions)	75.43	38.16	18.94	6.43	11.90
Average $\hat{\varepsilon}$	3.70	3.57	4.00	3.38	3.87
Std.Dev. $\hat{\varepsilon}$	1.43	1.49	1.39	1.29	1.26

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.46: Chain Size and Curvature Conditions: Frozen Dinner – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		2,494	2,119	375	84.4	46.2	38.2
Chain-Products, $x(p^u) > 0$		2,309	1,989	320	75.4	43.4	32.0
IRC holds for all stores in a chain		1,237	1,120	117	33.3	22.1	11.1
– Welfare decreases globally		324	320	4	4.8	4.3	0.5
– Welfare increases globally		347	341	6	5.5	5.2	0.4
Potential welfare increase							
– Output increases		594	572	22	11.3	9.7	1.6
– Output increases enough		486	475	11	8.2	7.6	0.6
Potential welfare decrease:							
– Output decreases:		434	429	5	6.7	6.1	0.6
– Output does not increase enough		1,714	1,414	300	64.5	33.7	30.8
Chains (%)							
IRC holds for all stores in a chain		53.57	56.31	36.56	44.09	51.05	34.66
– Welfare decreases globally		14.03	16.09	1.25	6.31	9.80	1.57
– Welfare increases globally		15.03	17.14	1.88	7.34	11.91	1.15
Potential welfare increase							
– Output increases		25.73	28.76	6.88	14.99	22.28	5.11
– Output increases enough		21.05	23.88	3.44	10.88	17.63	1.74
Potential welfare decrease:							
– Output decreases:		18.80	21.57	1.56	8.88	14.06	1.87
– Output does not increase enough		74.23	71.09	93.75	85.46	77.67	96.01

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.47: Store Demand Curvature: Frozen Dinner – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	22,182	5,954	8,338	3,317	4,573
Sales ($ millions)	117.16	29.34	48.32	17.08	22.42
Average $\hat{\varepsilon}$	3.57	3.41	3.85	3.24	3.51
Std.Dev. $\hat{\varepsilon}$	1.36	1.56	1.34	1.14	1.15

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.48: Chain Size and Curvature Conditions: Frozen Dinner – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,078	2,449	629	122.4	54.9	67.5
Chain-Products, $x(p^u) > 0$		3,009	2,413	596	117.2	53.6	63.5
IRC holds for all stores in a chain		1,295	1,123	172	42.4	22.8	19.6
– Welfare decreases globally		296	293	3	4.1	4.0	0.1
– Welfare increases globally		334	332	2	4.6	4.5	0.2
Potential welfare increase							
– Output increases		710	676	34	13.9	11.0	2.8
– Output increases enough		535	524	11	8.5	7.6	0.9
Potential welfare decrease:							
– Output decreases:		480	467	13	8.3	6.9	1.4
– Output does not increase enough		2,355	1,781	574	106.1	44.2	61.8
Chains (%)							
IRC holds for all stores in a chain		43.04	46.54	28.86	36.16	42.47	30.83
– Welfare decreases globally		9.84	12.14	0.50	3.53	7.47	0.20
– Welfare increases globally		11.10	13.76	0.34	3.96	8.34	0.26
Potential welfare increase							
– Output increases		23.60	28.01	5.70	11.82	20.52	4.48
– Output increases enough		17.78	21.72	1.85	7.22	14.10	1.41
Potential welfare decrease:							
– Output decreases:		15.95	19.35	2.18	7.11	12.95	2.18
– Output does not increase enough		78.27	73.81	96.31	90.54	82.49	97.33

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.49: Store Demand Curvature: Frozen Dinner – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	19,533	5,852	7,170	2,636	3,875
Sales ($ millions)	102.61	29.69	39.86	14.03	19.04
Average $\hat{\varepsilon}$	3.57	3.35	3.91	3.20	3.53
Std.Dev. $\hat{\varepsilon}$	1.42	1.55	1.40	1.21	1.20

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.50: Chain Size and Curvature Conditions: Frozen Dinner – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,012	2,529	483	108.3	58.7	49.5
Chain-Products, $x(p^u) > 0$		2,921	2,469	452	102.6	56.4	46.2
IRC holds for all stores in a chain		1,269	1,149	120	36.1	24.0	12.2
– Welfare decreases globally		301	298	3	4.2	4.1	0.1
– Welfare increases globally		343	336	7	5.3	4.7	0.6
Potential welfare increase							
– Output increases		727	706	21	12.8	10.8	2.0
– Output increases enough		532	521	11	8.1	7.3	0.9
Potential welfare decrease:							
– Output decreases:		470	458	12	7.8	6.7	1.1
– Output does not increase enough		2,236	1,806	430	91.0	46.4	44.6
Chains (%)							
IRC holds for all stores in a chain		43.44	46.54	26.55	35.22	42.48	26.35
– Welfare decreases globally		10.30	12.07	0.66	4.10	7.25	0.25
– Welfare increases globally		11.74	13.61	1.55	5.17	8.36	1.27
Potential welfare increase							
– Output increases		24.89	28.59	4.65	12.48	19.20	4.28
– Output increases enough		18.21	21.10	2.43	7.94	12.89	1.90
Potential welfare decrease:							
– Output decreases:		16.09	18.55	2.65	7.60	11.96	2.28
– Output does not increase enough		76.55	73.15	95.13	88.64	82.19	96.50

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.51: Curvature Tests Summary: Frozen Pizza

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.96	3.95	3.92	3.87	3.96	3.95	3.92	3.87
Std.Dev of estimated $\hat{\varepsilon}$	1.32	1.42	1.33	1.39	1.32	1.42	1.33	1.39
Chain-Products (surviving)	95.52	93.36	96.51	96.32	94.26	93.17	96.14	95.90
IRC holds for all stores in a chain	39.31	49.20	40.92	42.36	34.98	37.74	34.79	33.23
– Welfare decreases globally	6.62	11.62	7.97	9.17	2.20	4.65	3.66	4.09
– Welfare increases globally	10.98	14.23	10.27	11.54	4.08	6.13	4.40	4.31
Potential welfare increase								
– Output increases	25.98	25.85	26.29	24.79	14.32	15.79	13.98	12.72
– Output increases enough	18.94	21.64	16.43	18.17	8.61	12.13	7.29	8.01
Potential welfare decrease								
– Output decreases	12.82	17.94	13.39	14.18	4.88	9.67	5.76	6.70
– Output does not increase enough	77.79	75.65	79.54	77.33	89.74	86.28	89.65	89.32

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.52: Descriptive Statistics: Frozen Pizza

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–88
Price ($)					
Average Price	3.16	3.31	3.18	3.30	3.00
Standard Deviation	1.68	1.78	1.60	1.69	1.66
Maximum Price	10.07	6.86	6.93	9.71	10.07
Minimum Price	0.70	0.81	0.88	0.86	0.70
Supermarket Stores					
Average Number of UPCs	10.8	6.8	10.5	10.9	11.3
Average Weekly Sales (units)	210.1	134.5	202.9	217.9	214.1
Average Weekly Sales ($)	500.53	325.35	522.31	533.24	479.23
Supermarket Chains					
Average Number of Stores	13.1	2.8	7.8	15.5	34.7
Average Number of UPCs	16.8	7.9	16.0	21.3	23.4
Average Weekly Sales (units)	2,713.8	359.5	1,523.8	3,296.1	7,139.7
Average Weekly Sales ($)	6,464.63	869.76	3,921.95	8,065.33	15,983.83
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.07	2.03	2.01	1.97	2.39
Maximum Coefficient of Variation	21.91	11.75	8.82	12.65	21.91
Minimum Coefficient of Variation	0.01	0.02	0.07	0.01	0.09
Overall Data					
Total Number of Chains	71	19	16	26	10
Total Number of Stores	929	54	124	404	347
Total Number of UPCs	192	54	88	153	79
Total Sales (millions of units)	38.6	1.3	4.9	17.6	14.9
Total Sales ($ millions)	92.0	3.1	12.6	43.0	33.2
Average Number of Weeks	185.8	172.8	188.1	188.5	183.4
Observations (millions)	1.86	0.06	0.24	0.83	0.72

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.53: Store Demand Curvature: Frozen Pizza – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	10,005	2,902	4,230	1,215	1,658
Sales ($ millions)	92.02	21.89	42.05	11.74	16.33
Average $\hat{\varepsilon}$	3.96	3.97	4.24	3.45	3.63
Std.Dev. $\hat{\varepsilon}$	1.32	1.48	1.25	1.14	1.08

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.54: Chain Size and Curvature Conditions: Frozen Pizza – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,249	911	338	97.6	40.8	56.8
Chain-Products, $x(p^u) > 0$		1,193	883	310	92.0	39.6	52.4
IRC holds for all stores in a chain		469	389	80	32.2	17.6	14.6
– Welfare decreases globally		79	77	2	2.0	1.9	0.2
– Welfare increases globally		131	127	4	3.8	3.3	0.5
Potential welfare increase							
– Output increases		310	277	33	13.2	8.7	4.5
– Output increases enough		226	214	12	7.9	6.2	1.7
Potential welfare decrease:							
– Output decreases:		153	144	9	4.5	3.6	0.9
– Output does not increase enough		928	637	291	82.6	32.4	50.2
Chains (%)							
IRC holds for all stores in a chain		39.31	44.05	25.81	34.98	44.33	27.89
– Welfare decreases globally		6.62	8.72	0.65	2.20	4.68	0.33
– Welfare increases globally		10.98	14.38	1.29	4.08	8.21	0.95
Potential welfare increase							
– Output increases		25.98	31.37	10.65	14.32	21.93	8.56
– Output increases enough		18.94	24.24	3.87	8.61	15.64	3.29
Potential welfare decrease:							
– Output decreases:		12.82	16.31	2.90	4.88	9.11	1.67
– Output does not increase enough		77.79	72.14	93.87	89.74	81.80	95.74

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.55: Store Demand Curvature: Frozen Pizza – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	6,657	2,837	1,965	632	1,223
Sales ($ millions)	65.54	24.70	21.45	6.99	12.41
Average $\hat{\varepsilon}$	3.95	3.78	4.25	3.66	3.97
Std.Dev. $\hat{\varepsilon}$	1.42	1.55	1.30	1.25	1.25

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.56: Chain Size and Curvature Conditions: Frozen Pizza – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,069	872	197	70.3	37.8	32.5
Chain-Products, $x(p^u) > 0$		998	824	174	65.5	36.1	29.4
IRC holds for all stores in a chain		491	446	45	24.7	17.2	7.5
– Welfare decreases globally		116	112	4	3.0	2.6	0.4
– Welfare increases globally		142	140	2	4.0	3.7	0.3
Potential welfare increase							
– Output increases		258	243	15	10.4	7.9	2.5
– Output increases enough		216	207	9	8.0	6.6	1.3
Potential welfare decrease:							
– Output decreases:		179	169	10	6.3	5.1	1.3
– Output does not increase enough		755	593	162	56.5	28.8	27.8
Chains (%)							
IRC holds for all stores in a chain		49.20	54.13	25.86	37.74	47.72	25.46
– Welfare decreases globally		11.62	13.59	2.30	4.65	7.26	1.44
– Welfare increases globally		14.23	16.99	1.15	6.13	10.23	1.08
Potential welfare increase							
– Output increases		25.85	29.49	8.62	15.79	21.78	8.43
– Output increases enough		21.64	25.12	5.17	12.13	18.35	4.49
Potential welfare decrease:							
– Output decreases:		17.94	20.51	5.75	9.67	14.08	4.25
– Output does not increase enough		75.65	71.97	93.10	86.28	79.63	94.46

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.57: Store Demand Curvature: Frozen Pizza – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	10,093	2,438	4,046	1,452	2,157
Sales ($ millions)	94.63	19.35	39.20	15.08	21.00
Average $\hat{\varepsilon}$	3.92	3.69	4.25	3.63	3.74
Std.Dev. $\hat{\varepsilon}$	1.33	1.51	1.31	1.17	1.09

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.58: Chain Size and Curvature Conditions: Frozen Pizza – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,261	930	331	98.4	42.9	55.5
Chain-Products, $x(p^u) > 0$		1,217	906	311	94.6	41.9	52.7
IRC holds for all stores in a chain		498	417	81	32.9	18.5	14.4
– Welfare decreases globally		97	94	3	3.5	3.2	0.2
– Welfare increases globally		126	124	2	4.2	3.3	0.9
Potential welfare increase							
– Output increases		320	292	28	13.2	9.6	3.6
– Output increases enough		200	189	11	6.9	5.5	1.4
Potential welfare decrease:							
– Output decreases:		163	151	12	5.5	4.2	1.3
– Output does not increase enough		968	675	293	84.8	34.9	49.9
Chains (%)							
IRC holds for all stores in a chain		40.92	46.03	26.05	34.79	44.23	27.27
– Welfare decreases globally		7.97	10.38	0.96	3.66	7.68	0.46
– Welfare increases globally		10.35	13.69	0.64	4.40	7.90	1.62
Potential welfare increase							
– Output increases		26.29	32.23	9.00	13.98	22.87	6.92
– Output increases enough		16.43	20.86	3.54	7.29	13.23	2.57
Potential welfare decrease:							
– Output decreases:		13.39	16.67	3.86	5.76	9.91	2.46
– Output does not increase enough		79.54	74.50	94.21	89.65	83.23	94.76

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.59: Store Demand Curvature: Frozen Pizza – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	8,836	2,309	3,402	1,252	1,873
Sales ($ millions)	81.89	18.23	33.22	12.66	17.79
Average $\hat{\varepsilon}$	3.87	3.58	4.25	3.60	3.73
Std.Dev. $\hat{\varepsilon}$	1.39	1.53	1.37	1.25	1.16

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.60: Chain Size and Curvature Conditions: Frozen Pizza – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,223	981	242	85.4	45.4	40.0
Chain-Products, $x(p^u) > 0$		1,178	951	227	81.9	44.0	37.9
IRC holds for all stores in a chain		499	443	56	27.2	18.0	9.2
– Welfare decreases globally		108	104	4	3.3	3.0	0.3
– Welfare increases globally		136	133	3	3.5	3.3	0.3
Potential welfare increase							
– Output increases		292	270	22	10.4	7.7	2.8
– Output increases enough		214	202	12	6.6	5.0	1.5
Potential welfare decrease:							
– Output decreases:		167	159	8	5.5	4.6	0.9
– Output does not increase enough		911	702	209	73.2	37.3	35.8
Chains (%)							
IRC holds for all stores in a chain		42.36	46.58	24.67	33.23	41.00	24.23
– Welfare decreases globally		9.17	10.94	1.76	4.09	6.85	0.89
– Welfare increases globally		11.54	13.99	1.32	4.31	7.41	0.72
Potential welfare increase							
– Output increases		24.79	28.39	9.69	12.72	17.41	7.28
– Output increases enough		18.17	21.24	5.29	8.01	11.42	4.05
Potential welfare decrease:							
– Output decreases:		14.18	16.72	3.52	6.70	10.50	2.30
– Output does not increase enough		77.33	73.82	92.07	89.32	84.85	94.52

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.61: Curvature Tests Summary: Cleaning Products

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.26	3.42	3.24	3.29	3.26	3.42	3.24	3.29
Std.Dev of estimated $\hat{\varepsilon}$	1.46	1.58	1.48	1.49	1.46	1.58	1.48	1.49
Chain-Products (surviving)	88.05	90.71	91.04	90.27	88.00	88.57	90.57	89.36
IRC holds for all stores in a chain	37.10	60.24	35.66	37.93	24.13	42.63	28.67	23.46
– Welfare decreases globally	11.31	21.69	10.25	12.50	4.59	8.42	3.84	6.24
– Welfare increases globally	14.48	21.08	12.70	13.36	7.86	11.61	4.50	6.32
Potential welfare increase								
– Output increases	26.24	29.52	25.82	27.16	15.86	22.46	12.18	16.06
– Output increases enough	20.36	24.10	22.13	24.14	11.40	13.13	9.54	12.61
Potential welfare decrease								
– Output decreases	18.55	27.11	19.26	22.84	7.75	12.43	7.42	11.81
– Output does not increase enough	74.21	69.88	71.72	70.69	84.90	82.48	85.67	83.01

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.62: Descriptive Statistics: Cleaning Products

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–58
Price ($)					
Average Price	2.58	2.55	2.35	2.58	2.68
Standard Deviation	1.19	1.29	1.18	1.18	1.17
Maximum Price	7.26	5.06	4.54	6.44	7.26
Minimum Price	0.62	0.62	0.67	0.74	0.92
Supermarket Stores					
Average Number of UPCs	2.1	1.4	1.8	2.3	2.3
Average Weekly Sales (units)	16.2	8.6	11.4	15.6	22.2
Average Weekly Sales ($)	37.47	18.08	22.34	35.26	55.25
Supermarket Chains					
Average Number of Stores	11.2	3.6	8.1	14.6	32.3
Average Number of UPCs	4.1	2.1	3.6	5.4	8.0
Average Weekly Sales (units)	171.9	27.8	87.5	216.2	665.8
Average Weekly Sales ($)	398.02	58.57	171.61	490.04	1,658.51
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	1.97	1.65	1.53	1.99	2.65
Maximum Coefficient of Variation	25.61	7.84	6.68	10.07	25.61
Minimum Coefficient of Variation	0.00	0.01	0.00	0.00	0.03
Overall Data					
Total Number of Chains	54	18	14	16	6
Total Number of Stores	607	65	114	234	194
Total Number of UPCs	51	14	19	27	28
Total Sales (millions of units)	1.9	0.1	0.3	0.7	0.8
Total Sales ($ millions)	4.4	0.2	0.5	1.6	2.1
Average Number of Weeks	187.1	175.3	186.4	187.3	189.4
Observations (millions)	0.24	0.02	0.04	0.10	0.09

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price × 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.63: Store Demand Curvature: Cleaning Prods. – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	1,290	715	306	135	134
Sales ($ millions)	4.41	2.08	1.29	0.51	0.52
Average $\hat{\varepsilon}$	3.26	3.23	3.57	2.62	3.38
Std.Dev. $\hat{\varepsilon}$	1.46	1.50	1.46	1.22	1.26

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.64: Chain Size and Curvature Conditions: Cleaning Prods. – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		251	223	28	5.0	3.2	1.8
Chain-Products, $x(p^u) > 0$		221	196	25	4.4	2.8	1.6
IRC holds for all stores in a chain		82	82	0	1.1	1.1	0.0
– Welfare decreases globally		25	25	0	0.2	0.2	0.0
– Welfare increases globally		32	32	0	0.3	0.3	0.0
Potential welfare increase							
– Output increases		58	55	3	0.7	0.5	0.2
– Output increases enough		45	43	2	0.5	0.4	0.1
Potential welfare decrease:							
– Output decreases:		41	41	0	0.3	0.3	0.0
– Output does not increase enough		164	142	22	3.7	2.3	1.4
Chains (%)							
IRC holds for all stores in a chain		37.10	41.84	0.00	24.13	37.63	0.00
– Welfare decreases globally		11.31	12.76	0.00	4.59	7.15	0.00
– Welfare increases globally		14.48	16.33	0.00	7.86	12.26	0.00
Potential welfare increase							
– Output increases		26.24	28.06	12.00	15.86	19.07	10.13
– Output increases enough		20.36	21.94	8.00	11.40	14.40	6.03
Potential welfare decrease:							
– Output decreases:		18.55	20.92	0.00	7.75	12.08	0.00
– Output does not increase enough		74.21	72.45	88.00	84.90	81.48	91.01

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4}(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.65: Store Demand Curvature: Cleaning Prods. – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	812	546	126	56	84
Sales ($ millions)	3.08	1.70	0.58	0.23	0.56
Average $\hat{\varepsilon}$	3.42	3.29	3.84	2.98	3.91
Std.Dev. $\hat{\varepsilon}$	1.58	1.62	1.58	1.16	1.32

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.66: Chain Size and Curvature Conditions: Cleaning Prods. – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		183	167	16	3.5	2.3	1.2
Chain-Products, $x(p^u) > 0$		166	152	14	3.1	2.0	1.1
IRC holds for all stores in a chain		100	97	3	1.3	1.1	0.2
– Welfare decreases globally		36	36	0	0.3	0.3	0.0
– Welfare increases globally		35	35	0	0.4	0.4	0.0
Potential welfare increase							
– Output increases		49	47	2	0.7	0.6	0.1
– Output increases enough		40	39	1	0.4	0.4	0.0
Potential welfare decrease:							
– Output decreases:		45	45	0	0.4	0.4	0.0
– Output does not increase enough		116	104	12	2.5	1.5	1.0
Chains (%)							
IRC holds for all stores in a chain		60.24	63.82	21.43	42.63	54.77	20.62
– Welfare decreases globally		21.69	23.68	0.00	8.42	13.07	0.00
– Welfare increases globally		21.08	23.03	0.00	11.61	18.01	0.00
Potential welfare increase							
– Output increases		29.52	30.92	14.29	22.46	27.94	12.52
– Output increases enough		24.10	25.66	7.14	13.13	19.09	2.33
Potential welfare decrease:							
– Output decreases:		27.11	29.61	0.00	12.43	19.29	0.00
– Output does not increase enough		69.88	68.42	85.71	82.48	76.39	93.54

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4}(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.67: Store Demand Curvature: Cleaning Prods. – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	1,376	716	328	138	194
Sales ($ millions)	4.83	2.15	1.34	0.49	0.84
Average $\hat{\varepsilon}$	3.24	3.21	3.36	2.75	3.51
Std.Dev. $\hat{\varepsilon}$	1.48	1.49	1.58	1.18	1.37

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.68: Chain Size and Curvature Conditions: Cleaning Prods. – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		268	240	28	5.3	3.5	1.9
Chain-Products, $x(p^u) > 0$		244	219	25	4.8	3.1	1.7
IRC holds for all stores in a chain		87	85	2	1.4	0.9	0.4
– Welfare decreases globally		25	25	0	0.2	0.2	0.0
– Welfare increases globally		31	31	0	0.2	0.2	0.0
Potential welfare increase							
– Output increases		63	63	0	0.6	0.6	0.0
– Output increases enough		54	54	0	0.5	0.5	0.0
Potential welfare decrease:							
– Output decreases:		47	47	0	0.4	0.4	0.0
– Output does not increase enough		175	152	23	4.1	2.5	1.6
Chains (%)							
IRC holds for all stores in a chain		35.66	38.81	8.00	28.67	29.95	26.32
– Welfare decreases globally		10.25	11.42	0.00	3.84	5.94	0.00
– Welfare increases globally		12.70	14.16	0.00	4.50	6.96	0.00
Potential welfare increase							
– Output increases		25.82	28.77	0.00	12.18	18.82	0.00
– Output increases enough		22.13	24.66	0.00	9.54	14.74	0.00
Potential welfare decrease:							
– Output decreases:		19.26	21.46	0.00	7.42	11.47	0.00
– Output does not increase enough		71.72	69.41	92.00	85.67	80.23	95.65

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4}(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.69: Store Demand Curvature: Cleaning Prods. – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	1,170	640	280	101	149
Sales ($ millions)	4.15	1.87	1.18	0.35	0.75
Average $\hat{\varepsilon}$	3.29	3.21	3.53	2.82	3.47
Std.Dev. $\hat{\varepsilon}$	1.49	1.51	1.57	1.24	1.33

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.70: Chain Size and Curvature Conditions: Cleaning Prods. – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		257	240	17	4.7	3.4	1.3
Chain-Products, $x(p^u) > 0$		232	216	16	4.2	3.0	1.1
IRC holds for all stores in a chain		88	88	0	1.0	1.0	0.0
– Welfare decreases globally		29	29	0	0.3	0.3	0.0
– Welfare increases globally		31	31	0	0.3	0.3	0.0
Potential welfare increase							
– Output increases		63	62	1	0.7	0.6	0.0
– Output increases enough		56	56	0	0.5	0.5	0.0
Potential welfare decrease:							
– Output decreases:		53	52	1	0.5	0.4	0.0
– Output does not increase enough		164	149	15	3.4	2.3	1.1
Chains (%)							
IRC holds for all stores in a chain		37.93	40.74	0.00	23.46	32.41	0.00
– Welfare decreases globally		12.50	13.43	0.00	6.24	8.62	0.00
– Welfare increases globally		13.36	14.35	0.00	6.32	8.74	0.00
Potential welfare increase							
– Output increases		27.16	28.70	6.25	16.06	20.80	3.62
– Output increases enough		24.14	25.93	0.00	12.61	17.42	0.00
Potential welfare decrease:							
– Output decreases:		22.84	24.07	6.25	11.81	14.91	3.68
– Output does not increase enough		70.69	68.98	93.75	83.01	77.70	96.92

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\underline{ACV4}(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.71: Curvature Tests Summary: Salty Snacks

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.15	3.26	3.16	3.20	3.15	3.26	3.16	3.20
Std.Dev of estimated $\hat{\varepsilon}$	1.31	1.41	1.32	1.38	1.31	1.41	1.32	1.38
Chain-Products (surviving)	97.32	95.44	98.32	97.21	96.79	96.37	97.93	96.61
IRC holds for all stores in a chain	36.99	53.08	35.74	36.91	32.45	43.88	31.56	30.89
– Welfare decreases globally	9.22	13.27	8.04	8.88	4.20	5.61	4.41	4.20
– Welfare increases globally	11.18	18.18	11.75	11.50	4.82	8.36	5.12	5.08
Potential welfare increase								
– Output increases	29.07	30.13	29.99	29.35	15.95	16.51	16.02	17.15
– Output increases enough	21.90	24.91	22.96	20.83	10.15	13.10	10.76	9.70
Potential welfare decrease								
– Output decreases	16.34	17.23	14.68	16.64	8.60	8.64	7.75	8.36
– Output does not increase enough	72.68	69.69	70.75	72.77	85.27	82.89	84.31	85.68

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.72: Descriptive Statistics: Salty Snacks

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–87
Price ($)					
Average Price	2.56	2.52	2.52	2.55	2.59
Standard Deviation	0.95	0.88	1.04	0.94	0.94
Maximum Price	7.89	7.17	7.48	7.89	7.56
Minimum Price	0.25	0.83	0.25	0.68	0.81
Supermarket Stores					
Average Number of UPCs	14.4	8.3	12.4	15.1	15.2
Average Weekly Sales (units)	246.5	111.0	182.7	234.0	298.7
Average Weekly Sales ($)	589.42	280.47	431.18	569.26	702.78
Supermarket Chains					
Average Number of Stores	14.1	3.2	8.0	15.7	35.6
Average Number of UPCs	30.2	10.9	26.1	38.2	46.2
Average Weekly Sales (units)	3,382.1	326.8	1,423.8	3,579.7	10,159.2
Average Weekly Sales ($)	8,085.83	825.96	3,359.59	8,707.80	23,898.76
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	1.61	1.45	1.43	1.62	1.80
Maximum Coefficient of Variation	16.96	13.19	16.96	16.73	16.79
Minimum Coefficient of Variation	0.00	0.05	0.02	0.00	0.02
Overall Data					
Total Number of Chains	66	16	14	26	10
Total Number of Stores	929	52	112	409	356
Total Number of UPCs	422	81	147	290	171
Total Sales (millions of units)	45.3	1.0	4.1	19.1	21.1
Total Sales ($ millions)	108.4	2.6	9.6	46.4	49.7
Average Number of Weeks	174.7	163.6	175.7	177.5	172.0
Observations (millions)	2.34	0.07	0.24	1.10	0.93

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price × 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.73: Store Demand Curvature: Salty Snacks – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	13,414	6,970	3,729	1,332	1,383
Sales ($ millions)	108.36	46.71	35.72	13.52	12.41
Average $\hat{\varepsilon}$	3.15	3.32	3.10	2.59	2.95
Std.Dev. $\hat{\varepsilon}$	1.31	1.47	1.15	0.89	0.96

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.74: Chain Size and Curvature Conditions: Salty Snacks – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		2,050	1,660	390	112.0	51.8	60.1
Chain-Products, $x(p^u) > 0$		1,995	1,624	371	108.4	50.8	57.6
IRC holds for all stores in a chain		738	681	57	35.2	22.5	12.6
– Welfare decreases globally		184	178	6	4.6	3.5	1.0
– Welfare increases globally		223	221	2	5.2	4.5	0.7
Potential welfare increase							
– Output increases		580	540	40	17.3	12.1	5.2
– Output increases enough		437	415	22	11.0	8.5	2.5
Potential welfare decrease:							
– Output decreases:		326	310	16	9.3	6.6	2.7
– Output does not increase enough		1,450	1,116	334	92.4	39.9	52.5
Chains (%)							
IRC holds for all stores in a chain		36.99	41.93	15.36	32.45	44.37	21.94
– Welfare decreases globally		9.22	10.96	1.62	4.20	6.92	1.81
– Welfare increases globally		11.18	13.61	0.54	4.82	8.90	1.23
Potential welfare increase							
– Output increases		29.07	33.25	10.78	15.95	23.84	8.99
– Output increases enough		21.90	25.55	5.93	10.15	16.69	4.38
Potential welfare decrease:							
– Output decreases:		16.34	19.09	4.31	8.60	13.08	4.64
– Output does not increase enough		72.68	68.72	90.03	85.27	78.58	91.16

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.75: Store Demand Curvature: Salty Snacks – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	9,324	5,683	1,921	694	1,026
Sales ($ millions)	79.73	43.86	17.79	7.97	10.10
Average $\hat{\varepsilon}$	3.26	3.23	3.34	2.92	3.48
Std.Dev. $\hat{\varepsilon}$	1.41	1.48	1.32	1.19	1.27

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.76: Chain Size and Curvature Conditions: Salty Snacks – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		1,666	1,447	219	82.7	46.2	36.4
Chain-Products, $x(p^u) > 0$		1,590	1,384	206	79.7	44.9	34.9
IRC holds for all stores in a chain		844	787	57	35.0	23.3	11.7
– Welfare decreases globally		211	208	3	4.5	4.3	0.2
– Welfare increases globally		289	283	6	6.7	5.7	0.9
Potential welfare increase							
– Output increases		479	465	14	13.2	11.0	2.1
– Output increases enough		396	384	12	10.4	8.5	1.9
Potential welfare decrease:							
– Output decreases:		274	268	6	6.9	6.2	0.7
– Output does not increase enough		1,108	926	182	66.1	34.6	31.5
Chains (%)							
IRC holds for all stores in a chain		53.08	56.86	27.67	43.88	52.00	33.45
– Welfare decreases globally		13.27	15.03	1.46	5.61	9.56	0.52
– Welfare increases globally		18.18	20.45	2.91	8.36	12.82	2.63
Potential welfare increase							
– Output increases		30.13	33.60	6.80	16.51	24.58	6.11
– Output increases enough		24.91	27.75	5.83	13.10	19.02	5.49
Potential welfare decrease:							
– Output decreases:		17.23	19.36	2.91	8.64	13.79	2.00
– Output does not increase enough		69.69	66.91	88.35	82.89	77.22	90.19

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.77: Store Demand Curvature: Salty Snacks – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	13,935	6,362	4,146	1,573	1,854
Sales ($ millions)	113.31	43.94	35.70	16.14	17.54
Average $\hat{\varepsilon}$	3.16	3.16	3.30	2.79	3.10
Std.Dev. $\hat{\varepsilon}$	1.32	1.44	1.31	1.03	1.05

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.78: Chain Size and Curvature Conditions: Salty Snacks – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		2,086	1,686	400	115.7	54.3	61.4
Chain-Products, $x(p^u) > 0$		2,051	1,661	390	113.3	53.6	59.7
IRC holds for all stores in a chain		733	673	60	35.8	22.8	13.0
– Welfare decreases globally		165	160	5	5.0	4.0	1.0
– Welfare increases globally		241	239	2	5.8	5.2	0.6
Potential welfare increase							
– Output increases		615	572	43	18.1	13.1	5.1
– Output increases enough		471	445	26	12.2	9.0	3.2
Potential welfare decrease:							
– Output decreases:		301	289	12	8.8	7.2	1.6
– Output does not increase enough		1,451	1,101	350	95.5	40.8	54.7
Chains (%)							
IRC holds for all stores in a chain		35.74	40.52	15.38	31.56	42.51	21.73
– Welfare decreases globally		8.04	9.63	1.28	4.41	7.48	1.65
– Welfare increases globally		11.75	14.39	0.51	5.12	9.73	0.98
Potential welfare increase							
– Output increases		29.99	34.44	11.03	16.02	24.33	8.54
– Output increases enough		22.96	26.79	6.67	10.76	16.84	5.30
Potential welfare decrease:							
– Output decreases:		14.68	17.40	3.08	7.75	13.37	2.71
– Output does not increase enough		70.75	66.29	89.74	84.31	76.10	91.69

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.79: Store Demand Curvature: Salty Snacks – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	12,223	5,832	3,499	1,303	1,589
Sales ($ millions)	99.82	40.63	31.45	12.70	15.04
Average $\hat{\varepsilon}$	3.20	3.16	3.40	2.81	3.23
Std.Dev. $\hat{\varepsilon}$	1.38	1.46	1.38	1.12	1.13

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.80: Chain Size and Curvature Conditions: Salty Snacks – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		2,040	1,736	304	103.3	55.9	47.4
Chain-Products, $x(p^u) > 0$		1,983	1,696	287	99.8	54.6	45.2
IRC holds for all stores in a chain		732	688	44	30.8	22.4	8.4
– Welfare decreases globally		176	173	3	4.2	3.6	0.6
– Welfare increases globally		228	228	0	5.1	5.1	0.0
Potential welfare increase							
– Output increases		582	552	30	17.1	13.6	3.5
– Output increases enough		413	398	15	9.7	8.1	1.6
Potential welfare decrease:							
– Output decreases:		330	320	10	8.3	6.7	1.6
– Output does not increase enough		1,443	1,180	263	85.5	43.4	42.1
Chains (%)							
IRC holds for all stores in a chain		36.91	40.57	15.33	30.89	41.02	18.64
– Welfare decreases globally		8.88	10.20	1.05	4.20	6.64	1.26
– Welfare increases globally		11.50	13.44	0.00	5.08	9.28	0.00
Potential welfare increase							
– Output increases		29.35	32.55	10.45	17.15	24.94	7.75
– Output increases enough		20.83	23.47	5.23	9.70	14.84	3.50
Potential welfare decrease:							
– Output decreases:		16.64	18.87	3.48	8.36	12.36	3.52
– Output does not increase enough		72.77	69.58	91.64	85.68	79.49	93.16

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.81: Curvature Tests Summary: Soup

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.18	3.25	3.26	3.28	3.18	3.25	3.26	3.28
Std.Dev of estimated $\hat{\varepsilon}$	1.43	1.50	1.43	1.47	1.43	1.50	1.43	1.47
Chain-Products (surviving)	89.13	84.96	90.70	90.03	83.02	76.69	85.70	82.91
IRC holds for all stores in a chain	38.37	52.96	36.77	36.91	25.82	42.07	25.95	27.98
– Welfare decreases globally	9.32	14.76	9.17	9.84	3.96	7.73	3.35	4.86
– Welfare increases globally	11.67	17.70	11.43	12.00	5.30	10.26	5.63	6.53
Potential welfare increase								
– Output increases	27.96	27.73	27.88	28.56	17.52	18.64	17.78	18.78
– Output increases enough	20.15	23.04	19.93	20.52	11.42	13.77	11.03	11.35
Potential welfare decrease								
– Output decreases	16.54	21.20	17.32	18.44	8.81	11.65	7.64	9.65
– Output does not increase enough	74.91	71.31	74.97	73.00	85.22	80.82	85.14	83.26

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.82: Descriptive Statistics: Soup

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–88
Price ($)					
Average Price	1.29	1.34	1.25	1.29	1.30
Standard Deviation	0.52	0.60	0.55	0.48	0.55
Maximum Price	7.34	3.66	3.64	4.96	7.34
Minimum Price	0.14	0.18	0.16	0.14	0.17
Supermarket Stores					
Average Number of UPCs	20.0	11.2	16.4	22.0	20.3
Average Weekly Sales (units)	452.1	234.8	363.8	456.9	508.6
Average Weekly Sales ($)	449.31	252.76	339.64	481.02	479.31
Supermarket Chains					
Average Number of Stores	13.3	3.0	8.0	15.6	35.8
Average Number of UPCs	40.2	14.2	35.1	56.5	57.4
Average Weekly Sales (units)	5,952.8	673.5	2,823.6	6,947.1	17,491.3
Average Weekly Sales ($)	5,916.16	725.07	2,636.31	7,314.35	16,483.75
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.50	2.40	2.10	2.45	3.07
Maximum Coefficient of Variation	16.42	12.76	10.82	15.32	16.42
Minimum Coefficient of Variation	0.00	0.03	0.01	0.00	0.01
Overall Data					
Total Number of Chains	71	20	15	26	10
Total Number of Stores	944	61	120	405	358
Total Number of UPCs	249	101	137	222	146
Total Sales (millions of units)	84.6	2.5	8.7	37.1	36.4
Total Sales ($ millions)	84.1	2.7	8.1	39.0	34.3
Average Number of Weeks	190.7	176.0	190.5	192.1	190.4
Observations (millions)	3.60	0.12	0.38	1.71	1.39

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price $\times$ 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.83: Store Demand Curvature: Soup – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	18,858	10,842	4,626	1,603	1,787
Sales ($ millions)	84.10	43.98	23.18	7.56	9.38
Average $\hat{\varepsilon}$	3.18	3.33	3.21	2.45	2.88
Std.Dev. $\hat{\varepsilon}$	1.43	1.52	1.33	1.00	1.15

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.84: Chain Size and Curvature Conditions: Soup – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,202	2,639	563	101.3	53.2	48.1
Chain-Products, $x(p^u) > 0$		2,854	2,405	449	84.1	46.8	37.4
IRC holds for all stores in a chain		1,095	1,040	55	21.7	17.1	4.6
– Welfare decreases globally		266	265	1	3.3	3.3	0.0
– Welfare increases globally		333	331	2	4.5	4.2	0.2
Potential welfare increase							
– Output increases		798	750	48	14.7	11.6	3.2
– Output increases enough		575	551	24	9.6	8.2	1.4
Potential welfare decrease:							
– Output decreases:		472	463	9	7.4	6.8	0.6
– Output does not increase enough		2,138	1,732	406	71.7	36.8	34.9
Chains (%)							
IRC holds for all stores in a chain		38.37	43.24	12.25	25.82	36.64	12.27
– Welfare decreases globally		9.32	11.02	0.22	3.96	7.03	0.11
– Welfare increases globally		11.67	13.76	0.45	5.30	9.09	0.57
Potential welfare increase							
– Output increases		27.96	31.19	10.69	17.52	24.74	8.50
– Output increases enough		20.15	22.91	5.35	11.42	17.50	3.82
Potential welfare decrease:							
– Output decreases:		16.54	19.25	2.00	8.81	14.58	1.58
– Output does not increase enough		74.91	72.02	90.42	85.22	78.69	93.39

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.85: Store Demand Curvature: Soup – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	12,144	7,647	2,295	827	1,375
Sales ($ millions)	54.35	31.80	10.31	4.32	7.92
Average $\hat{\varepsilon}$	3.25	3.10	3.59	2.98	3.70
Std.Dev. $\hat{\varepsilon}$	1.50	1.51	1.50	1.41	1.37

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.86: Chain Size and Curvature Conditions: Soup – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		2,687	2,400	287	70.8	47.5	23.3
Chain-Products, $x(p^u) > 0$		2,283	2,077	206	54.3	39.3	15.1
IRC holds for all stores in a chain		1,209	1,156	53	22.9	19.1	3.8
– Welfare decreases globally		337	335	2	4.2	4.1	0.1
– Welfare increases globally		404	398	6	5.6	5.1	0.5
Potential welfare increase							
– Output increases		633	615	18	10.1	9.2	0.9
– Output increases enough		526	516	10	7.5	7.0	0.5
Potential welfare decrease:							
– Output decreases:		484	479	5	6.3	6.1	0.2
– Output does not increase enough		1,628	1,445	183	43.9	30.4	13.5
Chains (%)							
IRC holds for all stores in a chain		52.96	55.66	25.73	42.07	48.62	24.99
– Welfare decreases globally		14.76	16.13	0.97	7.73	10.39	0.79
– Welfare increases globally		17.70	19.16	2.91	10.26	12.86	3.48
Potential welfare increase							
– Output increases		27.73	29.61	8.74	18.64	23.41	6.17
– Output increases enough		23.04	24.84	4.85	13.77	17.79	3.30
Potential welfare decrease:							
– Output decreases:		21.20	23.06	2.43	11.65	15.50	1.62
– Output does not increase enough		71.31	69.57	88.83	80.82	77.45	89.61

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $\overline{ACV4(-)}$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.87: Store Demand Curvature: Soup – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	19,238	9,051	5,909	1,931	2,347
Sales ($ millions)	85.69	35.87	28.60	9.54	11.68
Average $\hat{\varepsilon}$	3.26	3.33	3.48	2.65	2.98
Std.Dev. $\hat{\varepsilon}$	1.43	1.55	1.40	1.06	1.12

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.88: Chain Size and Curvature Conditions: Soup – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,259	2,720	539	100.0	52.1	47.9
Chain-Products, $x(p^u) > 0$		2,956	2,508	448	85.7	46.2	39.5
IRC holds for all stores in a chain		1,087	1,029	58	22.2	17.7	4.6
– Welfare decreases globally		271	270	1	2.9	2.8	0.0
– Welfare increases globally		338	334	4	4.8	4.5	0.3
Potential welfare increase							
– Output increases		824	770	54	15.2	10.9	4.4
– Output increases enough		589	563	26	9.4	7.4	2.1
Potential welfare decrease:							
– Output decreases:		512	504	8	6.5	5.9	0.6
– Output does not increase enough		2,216	1,806	410	73.0	36.2	36.8
Chains (%)							
IRC holds for all stores in a chain		36.77	41.03	12.95	25.95	38.23	11.60
– Welfare decreases globally		9.17	10.77	0.22	3.35	6.12	0.11
– Welfare increases globally		11.43	13.32	0.89	5.63	9.75	0.82
Potential welfare increase							
– Output increases		27.88	30.70	12.05	17.78	23.56	11.02
– Output increases enough		19.93	22.45	5.80	11.03	16.01	5.21
Potential welfare decrease:							
– Output decreases:		17.32	20.10	1.79	7.64	12.82	1.58
– Output does not increase enough		74.97	72.01	91.52	85.14	78.30	93.14

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.89: Store Demand Curvature: Soup – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	16,635	8,410	4,716	1,509	2,000
Sales ($ millions)	72.29	34.25	21.52	6.75	9.77
Average $\hat{\varepsilon}$	3.28	3.29	3.48	2.68	3.21
Std.Dev. $\hat{\varepsilon}$	1.47	1.54	1.46	1.13	1.28

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.90: Chain Size and Curvature Conditions: Soup – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,139	2,745	394	87.2	54.7	32.5
Chain-Products, $x(p^u) > 0$		2,826	2,513	313	72.3	48.0	24.3
IRC holds for all stores in a chain		1,043	1,004	39	20.2	17.2	3.0
– Welfare decreases globally		278	275	3	3.5	3.2	0.3
– Welfare increases globally		339	336	3	4.7	4.6	0.1
Potential welfare increase							
– Output increases		807	775	32	13.6	11.2	2.4
– Output increases enough		580	567	13	8.2	7.4	0.9
Potential welfare decrease:							
– Output decreases:		521	517	4	7.0	6.6	0.4
– Output does not increase enough		2,063	1,775	288	60.2	37.3	22.9
Chains (%)							
IRC holds for all stores in a chain		36.91	39.95	12.46	27.98	35.94	12.27
– Welfare decreases globally		9.84	10.94	0.96	4.86	6.64	1.35
– Welfare increases globally		12.00	13.37	0.96	6.53	9.59	0.50
Potential welfare increase							
– Output increases		28.56	30.84	10.22	18.78	23.28	9.91
– Output increases enough		20.52	22.56	4.15	11.35	15.33	3.50
Potential welfare decrease:							
– Output decreases:		18.44	20.57	1.28	9.65	13.74	1.58
– Output does not increase enough		73.00	70.63	92.01	83.26	77.74	94.14

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.91: Curvature Tests Summary: Yogurt

	Chain Products (#)				Chain Sales ($)			
	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)	S.W.(3)	S.W.(4)	M.S.(3)	M.S.(4)
Average estimated $\hat{\varepsilon}$	3.13	3.18	3.12	3.17	3.13	3.18	3.12	3.17
Std.Dev of estimated $\hat{\varepsilon}$	1.30	1.41	1.30	1.35	1.30	1.41	1.30	1.35
Chain-Products (surviving)	95.18	92.05	95.96	95.18	88.87	85.98	89.75	89.11
IRC holds for all stores in a chain	37.45	47.07	39.52	41.28	28.54	33.61	32.77	34.46
– Welfare decreases globally	8.30	13.34	8.25	9.61	3.92	6.80	3.85	4.89
– Welfare increases globally	10.96	14.80	10.62	11.47	5.03	7.50	4.84	5.75
Potential welfare increase								
– Output increases	26.97	26.94	25.42	24.71	16.25	17.82	14.38	14.36
– Output increases enough	20.46	22.03	19.19	18.61	10.75	13.98	9.96	10.28
Potential welfare decrease								
– Output decreases	14.84	18.90	15.63	16.34	7.80	11.58	7.94	8.44
– Output does not increase enough	75.46	73.24	76.65	76.00	86.32	81.22	86.81	85.34

Notes: Percentage of chain products or chain sales that fulfill each curvature condition for third and fourth degree Stone-Weierstrass polynomials and Müntz-Szász series expansion specifications of demand.

Table O.A.92: Descriptive Statistics: Yogurt

		Chain Size (number of stores)			
	All	2–5	6–10	11–20	21–87
Price ($)					
Average Price	1.18	1.12	1.17	1.12	1.27
Standard Deviation	1.02	0.93	1.00	0.99	1.06
Maximum Price	7.75	7.44	6.47	7.63	7.75
Minimum Price	0.35	0.41	0.37	0.36	0.35
Supermarket Stores					
Average Number of UPCs	27.8	18.7	24.0	34.2	23.7
Average Weekly Sales (units)	860.9	479.2	655.7	1,048.2	780.4
Average Weekly Sales ($)	681.43	382.19	517.64	791.96	656.18
Supermarket Chains					
Average Number of Stores	14.0	3.1	8.1	15.5	34.5
Average Number of UPCs	59.5	22.1	49.1	79.5	82.8
Average Weekly Sales (units)	11,784.3	1,384.5	5,125.1	15,813.5	25,884.5
Average Weekly Sales ($)	9,327.23	1,104.34	4,045.76	11,947.98	21,763.60
Within Chain UPC Price Dispersion (%)					
Average Coefficient of Variation	2.10	1.81	1.82	2.04	2.57
Maximum Coefficient of Variation	30.76	13.81	10.41	11.81	30.76
Minimum Coefficient of Variation	0.00	0.04	0.02	0.00	0.01
Overall Data					
Total Number of Chains	67	16	15	25	11
Total Number of Stores	937	49	121	387	380
Total Number of UPCs	489	146	215	386	275
Total Sales (millions of units)	160.3	4.3	15.7	81.1	59.2
Total Sales ($ millions)	126.9	3.4	12.4	61.2	49.8
Average Number of Weeks	187.8	185.8	190.3	187.4	187.8
Observations (millions)	4.90	0.17	0.55	2.48	1.69

Notes: The first block of price information is measured in dollars. The second one reports the average number of products and sales per store. The third block repeats it by chain and includes also the average number of stores. The next one, price dispersion, reports the average coefficient of variation (ratio of the within chain standard deviation of prices divided by the mean chain price × 100) across chains. The last block reports totals to give an idea of the size of the data.

Table O.A.93: Store Demand Curvature: Yogurt – S.W. Polynomial(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	26,068	10,639	8,311	3,337	3,781
Sales ($ millions)	126.92	48.84	40.30	18.19	19.59
Average $\hat{\varepsilon}$	3.13	3.38	3.19	2.58	2.80
Std.Dev. $\hat{\varepsilon}$	1.30	1.53	1.14	0.90	0.98

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.94: Chain Size and Curvature Conditions: Yogurt – S.W. Polynomial(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		4,191	3,404	787	142.8	73.3	69.5
Chain-Products, $x(p^u) > 0$		3,989	3,308	681	126.9	70.5	56.4
IRC holds for all stores in a chain		1,494	1,343	151	36.2	25.4	10.9
– Welfare decreases globally		331	326	5	5.0	4.6	0.4
– Welfare increases globally		437	430	7	6.4	5.9	0.5
Potential welfare increase							
– Output increases		1,076	1,011	65	20.6	16.2	4.4
– Output increases enough		816	786	30	13.6	11.6	2.1
Potential welfare decrease:							
– Output decreases:		592	575	17	9.9	8.8	1.1
– Output does not increase enough		3,010	2,370	640	109.5	56.1	53.5
Chains (%)							
IRC holds for all stores in a chain		37.45	40.60	22.17	28.54	35.98	19.24
– Welfare decreases globally		8.30	9.85	0.73	3.92	6.54	0.65
– Welfare increases globally		10.96	13.00	1.03	5.03	8.33	0.90
Potential welfare increase							
– Output increases		26.97	30.56	9.54	16.25	23.00	7.81
– Output increases enough		20.46	23.76	4.41	10.75	16.42	3.66
Potential welfare decrease:							
– Output decreases:		14.84	17.38	2.50	7.80	12.50	1.92
– Output does not increase enough		75.46	71.64	93.98	86.32	79.54	94.78

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.95: Store Demand Curvature: Yogurt – S.W. Polynomial(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	19,067	11,629	3,863	1,531	2,044
Sales ($ millions)	96.30	56.19	20.15	9.14	10.82
Average $\hat{\varepsilon}$	3.18	3.18	3.30	2.80	3.27
Std.Dev. $\hat{\varepsilon}$	1.41	1.49	1.32	1.08	1.24

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.96: Chain Size and Curvature Conditions: Yogurt – S.W. Polynomial(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		3,649	3,157	492	112.0	69.6	42.4
Chain-Products, $x(p^u) > 0$		3,359	2,954	405	96.3	64.4	31.9
IRC holds for all stores in a chain		1,581	1,486	95	32.4	26.8	5.6
– Welfare decreases globally		448	444	4	6.6	6.2	0.3
– Welfare increases globally		497	488	9	7.2	6.7	0.5
Potential welfare increase							
– Output increases		905	868	37	17.2	14.8	2.4
– Output increases enough		740	717	23	13.5	11.9	1.6
Potential welfare decrease:							
– Output decreases:		635	615	20	11.2	9.4	1.8
– Output does not increase enough		2,460	2,093	367	78.2	49.5	28.8
Chains (%)							
IRC holds for all stores in a chain		47.07	50.30	23.46	33.61	41.54	17.56
– Welfare decreases globally		13.34	15.03	0.99	6.80	9.65	1.05
– Welfare increases globally		14.80	16.52	2.22	7.50	10.43	1.57
Potential welfare increase							
– Output increases		26.94	29.38	9.14	17.82	22.93	7.50
– Output increases enough		22.03	24.27	5.68	13.98	18.42	5.00
Potential welfare decrease:							
– Output decreases:		18.90	20.82	4.94	11.58	14.52	5.65
– Output does not increase enough		73.24	70.85	90.62	81.22	76.77	90.23

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.97: Store Demand Curvature: Yogurt – M.S. Series(3)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	27,181	9,651	9,210	3,763	4,557
Sales ($ millions)	134.79	44.79	44.94	20.38	24.67
Average $\hat{\varepsilon}$	3.12	3.22	3.35	2.61	2.90
Std.Dev. $\hat{\varepsilon}$	1.30	1.51	1.25	0.93	1.01

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.98: Chain Size and Curvature Conditions: Yogurt – M.S. Series(3)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		4,280	3,463	817	150.2	78.4	71.8
Chain-Products, $x(p^u) > 0$		4,107	3,397	710	134.8	75.9	58.9
IRC holds for all stores in a chain		1,623	1,427	196	44.2	28.7	15.5
– Welfare decreases globally		339	330	9	5.2	4.6	0.6
– Welfare increases globally		436	431	5	6.5	6.0	0.5
Potential welfare increase							
– Output increases		1,044	996	48	19.4	16.2	3.1
– Output increases enough		788	759	29	13.4	11.6	1.8
Potential welfare decrease:							
– Output decreases:		642	620	22	10.7	9.3	1.4
– Output does not increase enough		3,148	2,483	665	117.0	61.3	55.7
Chains (%)							
IRC holds for all stores in a chain		39.52	42.01	27.61	32.77	37.80	26.29
– Welfare decreases globally		8.25	9.71	1.27	3.85	6.04	1.02
– Welfare increases globally		10.62	12.69	0.70	4.84	7.96	0.81
Potential welfare increase							
– Output increases		25.42	29.32	6.76	14.38	21.38	5.35
– Output increases enough		19.19	22.34	4.08	9.96	15.27	3.12
Potential welfare decrease:							
– Output decreases:		15.63	18.25	3.10	7.94	12.30	2.33
– Output does not increase enough		76.65	73.09	93.66	86.81	80.77	94.60

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.

Table O.A.99: Store Demand Curvature: Yogurt – M.S. Series(4)

		Curvature Region			
	All	Concave	Log-concave	Log-convex	Superconvex
Store-Products	24,407	9,531	7,976	3,095	3,805
Sales ($ millions)	121.10	44.05	39.53	16.85	20.67
Average $\hat{\varepsilon}$	3.17	3.18	3.40	2.69	3.02
Std.Dev. $\hat{\varepsilon}$	1.35	1.49	1.32	1.03	1.11

Notes: Store-products and sales such that $x(p^u) > 0$, across all posible regions of demand. The bottom of the table reports the average elasticity and curvature at the sales-weighted average store price p_{sj}, both for all demand estimates as well as by curvature region.

Table O.A.100: Chain Size and Curvature Conditions: Yogurt – M.S. Series(4)

		No. Chain-Products			Chain-Product Sales		
	No. Stores:	All	2–10	11+	All	2–10	11+
Chains (#, $ millions)							
Chain-Products		4,167	3,519	648	135.9	80.4	55.5
Chain-Products, $x(p^u) > 0$		3,966	3,412	554	121.1	77.3	43.8
IRC holds for all stores in a chain		1,637	1,477	160	41.7	30.1	11.6
– Welfare decreases globally		381	372	9	5.9	5.5	0.5
– Welfare increases globally		455	449	6	7.0	6.5	0.4
Potential welfare increase							
– Output increases		980	949	31	17.4	15.4	2.0
– Output increases enough		738	720	18	12.4	11.2	1.3
Potential welfare decrease:							
– Output decreases:		648	633	15	10.2	9.5	0.7
– Output does not increase enough		3,014	2,490	524	103.3	61.7	41.7
Chains (%)							
IRC holds for all stores in a chain		41.28	43.29	28.88	34.46	38.99	26.47
– Welfare decreases globally		9.61	10.90	1.62	4.89	7.06	1.08
– Welfare increases globally		11.47	13.16	1.08	5.75	8.47	0.94
Potential welfare increase							
– Output increases		24.71	27.81	5.60	14.36	19.89	4.59
– Output increases enough		18.61	21.10	3.25	10.28	14.45	2.92
Potential welfare decrease:							
– Output decreases:		16.34	18.55	2.71	8.44	12.27	1.67
– Output does not increase enough		76.00	72.98	94.58	85.34	79.81	95.08

Notes: Welfare decreases globally when, *IRC* and ACV1 hold together, i.e., $IRC \cap ACV1$. Similarly welfare increases globally if $IRC \cap ACV2$. For welfare to increase, it is necessary that output increases, i.e., $ACV4(+)$ should hold. The increase in output should be enough to compensate the misallocation effect to ensure that welfare increases, $ACV4(+) \cap ACV2$. Welfare decreases if output decreases, i.e., when $ACV4(-)$ holds. If output decreases, $ACV4(-)$, or does not increase enough, $ACV2$ fails, *3DPD* has the potential to decrease welfare, i.e., when $ACV4(-) \cup \overline{ACV2}$.