

Supplemental Materials for Jerry Hausman and Gregory Leonard, "The Competitive Effects of a New Product Introduction: A Case Study," The Journal of Industrial Economics L(3), SEPTEMBER 2002, pp. 237-264.

Appendix Table I: Demand System Parameter Estimates

Top Level Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	1.267373	1.192603
Time Trend	-0.000564	0.000082
Months	0.053558	0.009134
	-0.018446	0.009057
	-0.039466	0.008989
	-0.041973	0.008665
	-0.037427	0.008568
	-0.047270	0.008683
	-0.039320	0.008316
	-0.033675	0.008423
	-0.039100	0.008409
	-0.058543	0.008559
	-0.015193	0.009002
Cities	-0.035964	0.058298
	-0.824509	0.176820
	-0.356293	0.055235
	-0.648758	0.078491
	-0.252406	0.095171
	-0.627925	0.024123
	-0.175677	0.081262
	0.407630	0.020512
	-0.346636	0.032376
	-0.013526	0.073271
	0.696960	0.064610
	0.332719	0.103779
	-0.158365	0.133236
	-0.093072	0.061054
	0.248137	0.062497
	-0.766667	0.032445
Log PDI	1.092470	0.117842
Log Industry Price Index	-0.838952	0.074782

Appendix Table I: Demand System Parameter Estimates

Kleenex Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	-0.233452	0.087456
Time Trend	0.000038	0.000012
Months	-0.016291	0.003060
	-0.001514	0.002986
	0.002256	0.003017
	-0.005324	0.002936
	-0.012449	0.002937
	0.009796	0.003019
	0.004665	0.002913
	0.014775	0.002976
	0.006725	0.002983
	0.009637	0.003072
	-0.003825	0.003217
Cities	0.012589	0.005826
	-0.037807	0.008014
	-0.001538	0.003479
	0.018852	0.003417
	-0.005215	0.010403
	0.029226	0.008208
	0.047640	0.008988
	-0.035565	0.003749
	0.049298	0.006540
	-0.001002	0.007171
	-0.002707	0.003567
	0.020518	0.006977
	0.034829	0.012743
	0.017914	0.006516
	0.014607	0.004559
	0.040333	0.005857
L(Y/P)	0.032503	0.008550
Log Kleenex Price	-0.243757	0.010939
Log Cottonelle Price	0.054611	0.007151
Log ScotTissue Price	0.010624	0.005918
Log Charmin Price	0.075978	0.008634
Log Northern Price	0.077135	0.008265
Log Angel Soft Price	0.022978	0.007608

Appendix Table I: Demand System Parameter Estimates

Cottonelle Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	-0.190335	0.089863
Time Trend	-0.000128	0.000011
Months	-0.005326	0.003153
	0.008254	0.003080
	0.002605	0.003110
	0.009409	0.003025
	0.009104	0.003027
	0.011068	0.003111
	0.005889	0.003006
	0.001590	0.003068
	0.008900	0.003075
	0.002186	0.003166
	0.001942	0.003316
Cities	0.002207	0.006003
	0.056279	0.008224
	0.026261	0.003582
	0.016068	0.003516
	0.077164	0.010715
	0.089259	0.008429
	0.081352	0.009225
	0.011257	0.003859
	0.161268	0.006758
	0.004575	0.007377
	0.016135	0.003676
	0.114438	0.007179
	0.086181	0.013087
	0.042397	0.006703
	0.002169	0.004689
	0.123077	0.006018
L(Y/P)	0.023548	0.008798
Log Kleenex Price	0.054611	0.007151
Log Cottonelle Price	-0.222472	0.009357
Log ScotTissue Price	-0.013660	0.005322
Log Charmin Price	0.072746	0.007560
Log Northern Price	0.035509	0.007771
Log Angel Soft Price	0.060475	0.006852

Appendix Table I: Demand System Parameter Estimates

ScotTissue Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	0.176602	0.052274
Time Trend	-0.000090	0.000007
Months	-0.000305	0.001783
	0.003343	0.001742
	0.000758	0.001760
	-0.000370	0.001714
	0.002222	0.001715
	-0.002345	0.001757
	0.001261	0.001693
	0.001208	0.001730
	-0.000864	0.001735
	0.000041	0.001782
	-0.000476	0.001867
Cities	0.090937	0.003399
	0.060070	0.004859
	-0.053007	0.002031
	-0.027370	0.002039
	-0.025109	0.006095
	-0.129472	0.004952
	-0.064604	0.005607
	-0.016620	0.002213
	-0.018488	0.003849
	-0.086648	0.004295
	0.059692	0.002085
	-0.141022	0.004186
	-0.110882	0.007615
	-0.005311	0.003814
	0.012266	0.002770
	-0.119745	0.003545
L(Y/P)	-0.006555	0.005035
Log Kleenex Price	0.010624	0.005918
Log Cottonelle Price	-0.013660	0.005322
Log ScotTissue Price	-0.115206	0.009327
Log Charmin Price	0.081510	0.006516
Log Northern Price	0.009096	0.006058
Log Angel Soft Price	0.025952	0.006731

Appendix Table I: Demand System Parameter Estimates

Charmin Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	1.046300	0.089082
Time Trend	0.000114	0.000011
Months	0.022632	0.003103
	-0.004286	0.003010
	-0.004479	0.003042
	-0.002527	0.002960
	-0.005710	0.002963
	-0.014965	0.003044
	-0.009840	0.002941
	-0.007131	0.003005
	-0.005500	0.003009
	-0.011453	0.003096
	0.002968	0.003243
Cities	0.026403	0.005901
	-0.048398	0.008077
	0.045411	0.003526
	0.042226	0.003478
	0.010598	0.010532
	-0.020632	0.008385
	-0.087057	0.009215
	0.080057	0.003790
	-0.168245	0.006683
	0.058569	0.007336
	0.000342	0.003600
	-0.030343	0.007093
	-0.051760	0.013115
	-0.038471	0.006605
	-0.000733	0.004715
	-0.040673	0.005982
L(Y/P)	-0.055451	0.008667
Log Kleenex Price	0.075978	0.008634
Log Cottonelle Price	0.072746	0.007560
Log ScotTissue Price	0.081510	0.006516
Log Charmin Price	-0.475177	0.012330
Log Northern Price	0.144743	0.008834
Log Angel Soft Price	0.080910	0.008184

Appendix Table I: Demand System Parameter Estimates

Northern Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	-0.072269	0.098991
Time Trend	0.000001	0.000013
Months	-0.004458	0.003476
	-0.012404	0.003395
	-0.007882	0.003432
	-0.017274	0.003339
	-0.006424	0.003346
	-0.017052	0.003439
	-0.010160	0.003313
	-0.021807	0.003380
	-0.019405	0.003392
	-0.003310	0.003492
	-0.002626	0.003659
Cities	-0.063791	0.006613
	0.027690	0.009069
	-0.005141	0.003955
	-0.011712	0.003885
	-0.027713	0.011792
	0.111287	0.009305
	0.066179	0.010167
	-0.031674	0.004258
	0.100738	0.007412
	0.056158	0.008133
	-0.026857	0.004055
	0.167876	0.007919
	0.112212	0.014417
	-0.001137	0.007381
	-0.024116	0.005136
	0.046937	0.006624
L(Y/P)	0.019949	0.009688
Log Kleenex Price	0.077135	0.008265
Log Cottonelle Price	0.035509	0.007771
Log ScotTissue Price	0.009096	0.006058
Log Charmin Price	0.144743	0.008834
Log Northern Price	-0.330303	0.012121
Log Angel Soft Price	0.061154	0.007882

Appendix Table I: Demand System Parameter Estimates

Angel Soft Share Equation

	<u>Coefficient</u>	<u>Standard Error</u>
Constant	0.433596	0.076250
Time Trend	-0.000023	0.000010
Months	0.002790	0.002663
	0.002842	0.002595
	0.001382	0.002621
	0.008683	0.002550
	0.008544	0.002553
	0.007533	0.002622
	0.004177	0.002531
	0.005981	0.002585
	0.002963	0.002593
	-0.003334	0.002667
	-0.002701	0.002793
Cities	-0.020225	0.005061
	-0.021700	0.006977
	-0.009145	0.003025
	-0.004273	0.002990
	-0.045220	0.009039
	-0.069604	0.007192
	-0.027647	0.007875
	-0.009546	0.003260
	-0.117943	0.005695
	0.007453	0.006253
	-0.028277	0.003102
	-0.110255	0.006079
	-0.108022	0.011143
	-0.036217	0.005671
	-0.009358	0.004008
	-0.037936	0.005120
L(Y/P)	-0.035347	0.007433
Log Kleenex Price	0.022978	0.007608
Log Cottonelle Price	0.060475	0.006852
Log ScotTissue Price	0.025952	0.006731
Log Charmin Price	0.080910	0.008184
Log Northern Price	0.061154	0.007882
Log Angel Soft Price	-0.262795	0.010665

Appendix Table I: Demand System Parameter Estimates

Estimated Variance-Covariance Matrix of Error Terms

	<u>Top Level</u>	<u>Kleenex</u>	<u>Cottonelle</u>	<u>ScotTissue</u>	<u>Charmin</u>	<u>Northern</u>	<u>Angel Soft</u>
Top Level	0.008560	-0.000087	-0.000051	-0.000159	-0.000082	0.000376	0.000328
Kleenex	-0.000087	0.001092	-0.000182	-0.000076	-0.000330	-0.000270	-0.000176
Cottonelle	-0.000051	-0.000182	0.001157	-0.000078	-0.000238	-0.000440	-0.000173
ScotTissue	-0.000159	-0.000076	-0.000078	0.000351	-0.000021	-0.000106	-0.000053
Charmin	-0.000082	-0.000330	-0.000238	-0.000021	0.001118	-0.000326	-0.000154
Northern	0.000376	-0.000270	-0.000440	-0.000106	-0.000326	0.001425	-0.000201
Angel Soft	0.000328	-0.000176	-0.000173	-0.000053	-0.000154	-0.000201	0.000833

Appendix Table II: Own and Cross Price Elasticities

Month Specific Indicator Variables Included in the Specification

		With Respect To The Price Of						
		Kleenex	Cottonelle	Charmin	Northern	Angel Soft	ScotTissue	Private Label
Elasticity Of The Demand For	Kleenex	-3.914 (0.088)	0.456 (0.060)	0.505 (0.079)	0.662 (0.070)	0.423 (0.062)	0.095 (0.053)	0.073 (0.043)
	Cottonelle	0.534 (0.065)	-3.571 (0.087)	0.638 (0.080)	0.550 (0.074)	0.522 (0.062)	-0.063 (0.051)	-0.022 (0.042)
	Charmin	0.190 (0.023)	0.182 (0.021)	-2.518 (0.038)	0.315 (0.025)	0.198 (0.021)	0.204 (0.020)	0.032 (0.015)
	Northern	0.414 (0.048)	0.279 (0.046)	0.472 (0.063)	-3.553 (0.071)	0.298 (0.045)	0.096 (0.039)	-0.009 (0.031)
	Angel Soft	0.553 (0.077)	0.586 (0.071)	0.754 (0.090)	0.633 (0.082)	-4.181 (0.103)	0.139 (0.067)	-0.014 (0.053)
	ScotTissue	0.084 (0.039)	-0.061 (0.034)	0.434 (0.049)	0.175 (0.040)	0.079 (0.039)	-2.263 (0.068)	-0.042 (0.031)
	Private Label	0.114 (0.061)	-0.050 (0.055)	0.069 (0.072)	0.041 (0.065)	-0.024 (0.060)	-0.083 (0.060)	-1.691 (0.062)

Appendix Table III: Own and Cross Price Elasticities

Estimated Without Homogeneity and Symmetry Restrictions

		With Respect To The Price Of						
		Kleenex	Cottonelle	Charmin	Northern	Angel Soft	ScotTissue	Private Label
Elasticity Of The Demand For	Kleenex	-3.666 (0.115)	0.334 (0.092)	0.715 (0.125)	0.580 (0.107)	0.339 (0.126)	-0.982 (0.171)	0.032 (0.096)
	Cottonelle	0.954 (0.131)	-3.194 (0.105)	0.525 (0.142)	0.735 (0.122)	0.336 (0.144)	-0.086 (0.195)	-0.218 (0.110)
	Charmin	0.183 (0.037)	0.212 (0.029)	-2.305 (0.043)	0.331 (0.035)	0.331 (0.040)	0.556 (0.054)	0.057 (0.031)
	Northern	0.486 (0.089)	0.149 (0.071)	1.379 (0.099)	-3.077 (0.083)	0.402 (0.097)	-0.149 (0.132)	0.152 (0.074)
	Angel Soft	0.378 (0.126)	0.927 (0.101)	0.791 (0.134)	0.977 (0.117)	-4.072 (0.139)	0.856 (0.188)	0.316 (0.105)
	ScotTissue	0.126 (0.050)	-0.065 (0.040)	0.448 (0.056)	0.122 (0.047)	0.108 (0.054)	-1.839 (0.074)	0.059 (0.042)
	Private Label	0.283 (0.089)	0.364 (0.071)	0.351 (0.098)	0.121 (0.083)	0.178 (0.097)	0.185 (0.132)	-1.659 (0.074)

Appendix Table IV: Variety Effect

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Actual Price</u>	<u>Virtual Price</u>	<u>% Difference</u>	<u>Additional Annual Consumer Welfare</u>	<u>Standard Error</u>	<u>% of Annual Bath Tissue Expenditure</u>
<u>First Wave Cities (KBT Introduced Prior to January 1992)</u>						
Charlotte	\$25.82	\$38.72	50.0%	\$885,024	\$40,740	4.3%
Chicago	\$26.01	\$39.85	53.2%	\$3,413,716	\$157,817	4.8%
Dallas	\$25.71	\$39.64	54.2%	\$2,127,198	\$98,361	4.9%
Houston	\$24.99	\$40.70	62.9%	\$2,565,144	\$119,086	6.3%
Jacksonville	\$25.15	\$34.20	36.0%	\$294,376	\$13,468	2.4%
Kansas City	\$25.38	\$35.50	39.9%	\$458,040	\$20,994	2.9%
Memphis	\$26.34	\$33.94	28.8%	\$239,898	\$10,961	1.6%
Miami	\$24.81	\$35.91	44.7%	\$1,597,754	\$73,585	3.6%
Milwaukee	\$25.27	\$46.78	85.1%	\$1,930,798	\$90,711	10.3%
Nashville	\$25.45	\$34.12	34.1%	\$372,261	\$17,037	2.2%
New Orleans	\$24.16	\$35.53	47.0%	\$1,322,570	\$60,869	3.9%
Oklahoma City	\$26.87	\$35.98	33.9%	\$414,203	\$18,969	2.2%
Omaha	\$23.93	\$33.85	41.5%	\$274,906	\$12,586	3.1%
Orlando	\$24.61	\$35.76	45.3%	\$670,719	\$30,809	3.6%
San Antonio	\$24.10	\$41.66	72.9%	\$2,290,555	\$106,845	8.0%
St. Louis	\$24.06	\$41.85	74.0%	\$1,825,954	\$85,229	8.2%
Tampa	\$25.10	\$39.43	57.1%	\$1,855,238	\$85,819	5.4%
<u>Second Wave Cities (KBT Introduced July 1993)</u>						
Baltimore	\$28.43	\$37.43	31.6%	\$520,717	\$23,849	1.9%
Detroit	\$27.27	\$38.49	41.1%	\$1,401,117	\$64,438	3.1%
Washington, DC	\$27.31	\$38.13	39.6%	\$1,501,499	\$69,057	2.9%
<u>Third Wave Cities (KBT Introduced May 1994)</u>						
Buffalo/Rochester	\$25.56	\$32.09	25.5%	\$343,644	\$15,692	1.3%
Cincinnati	\$24.83	\$35.27	42.0%	\$803,682	\$36,926	3.2%
Cleveland	\$23.93	\$30.35	26.8%	\$548,634	\$25,126	1.5%
Columbus	\$26.08	\$31.48	20.7%	\$182,400	\$8,337	0.9%
Denver	\$25.99	\$34.05	31.0%	\$548,647	\$25,126	1.9%
Los Angeles	\$25.71	\$35.88	39.6%	\$3,767,335	\$173,654	2.9%
Louisville	\$22.69	\$28.78	26.8%	\$257,190	\$11,755	1.4%
Pittsburgh	\$24.25	\$30.99	27.8%	\$565,463	\$25,889	1.5%
San Diego	\$25.37	\$33.27	31.1%	\$375,580	\$17,185	1.9%
Syracuse	\$25.16	\$27.75	10.3%	\$40,929	\$1,868	0.2%
Total				\$33,395,190		3.5%

Appendix Table V: Estimated Price-Cost Margins

	<u>Kleenex</u>	<u>Cottonelle</u>	<u>ScotTissue</u>	<u>Charmin</u>	<u>Northern</u>	<u>Angel Soft</u>	<u>Private Label</u>
<u>First Wave Cities (KBT Introduced Prior to January 1992)</u>							
Charlotte	29.0%	19.8%	70.6%	45.2%	17.8%	30.5%	38.7%
Chicago	30.1%	30.3%	67.4%	37.1%	33.0%	14.5%	63.0%
Dallas	30.4%	24.1%	48.1%	46.0%	30.1%	29.3%	62.5%
Houston	33.0%	16.1%	54.8%	45.6%	25.8%	32.4%	62.3%
Jacksonville	23.6%	22.5%	54.5%	47.0%	24.0%	33.2%	65.4%
Kansas City	25.2%	36.3%	22.1%	48.1%	41.2%	16.3%	57.9%
Memphis	20.3%	29.7%	41.6%	44.4%	36.6%	36.1%	56.1%
Miami	27.1%	17.4%	55.5%	46.9%	24.4%	29.5%	69.0%
Milwaukee	38.5%	42.4%	55.5%	33.2%	39.8%	11.1%	50.3%
Nashville	22.7%	20.7%	40.9%	50.5%	32.3%	36.6%	45.9%
New Orleans	27.9%	20.8%	66.6%	43.9%	23.6%	23.9%	63.5%
Oklahoma City	22.7%	36.1%	19.7%	45.9%	49.5%	4.3%	57.6%
Omaha	25.8%	26.6%	32.1%	48.8%	41.8%	11.0%	65.1%
Orlando	27.3%	23.9%	57.5%	42.7%	26.7%	31.2%	67.8%
San Antonio	35.6%	7.8%	58.5%	45.4%	22.7%	28.0%	70.4%
St. Louis	35.9%	34.6%	25.4%	44.9%	36.3%	29.0%	47.4%
Tampa	31.3%	16.9%	57.8%	41.3%	28.0%	34.3%	67.1%
<u>Second Wave Cities (KBT Introduced July 1993)</u>							
Baltimore	21.6%	25.9%	65.7%	43.4%	24.9%	22.4%	68.1%
Detroit	25.7%	41.3%	46.4%	32.4%	47.5%	24.9%	49.0%
Washington, DC	25.1%	24.5%	55.9%	43.9%	27.0%	28.1%	70.9%
<u>Third Wave Cities (KBT Introduced May 1994)</u>							
Buffalo/Rochester	18.6%	33.5%	74.3%	34.6%	21.6%	17.5%	72.9%
Cincinnati	26.1%	35.5%	23.9%	44.8%	40.5%	28.7%	55.3%
Cleveland	19.2%	34.1%	53.4%	50.2%	35.4%	12.0%	41.4%
Columbus	15.9%	34.5%	20.6%	43.6%	30.9%	50.0%	55.2%
Denver	21.3%	5.9%	49.2%	40.0%	41.6%	22.0%	80.8%
Los Angeles	25.1%	3.7%	66.4%	40.8%	32.1%	22.5%	75.2%
Louisville	19.2%	36.0%	20.0%	52.5%	36.9%	22.4%	48.5%
Pittsburgh	19.7%	25.7%	63.6%	45.5%	29.5%	29.7%	46.0%
San Diego	21.4%	2.4%	60.3%	40.0%	30.8%	24.2%	83.0%
Syracuse	8.9%	40.9%	75.7%	31.8%	22.2%	26.7%	64.8%

Appendix Table VI: Total Consumer Welfare Effect

	<u>Additional Annual Consumer Welfare</u>	<u>Standard Error</u>	<u>% of Annual Bath Tissue Expenditure</u>
<u>First Wave Cities (KBT Introduced Prior to January 1992)</u>			
Charlotte	\$1,754,180	\$58,426	8.5%
Chicago	\$6,682,785	\$210,602	9.4%
Dallas	\$4,228,866	\$122,449	9.8%
Houston	\$4,776,188	\$144,324	11.8%
Jacksonville	\$682,051	\$18,831	5.7%
Kansas City	\$1,061,718	\$30,752	6.8%
Memphis	\$642,623	\$15,852	4.4%
Miami	\$3,338,276	\$97,410	7.5%
Milwaukee	\$3,357,554	\$110,936	17.9%
Nashville	\$918,508	\$25,343	5.5%
New Orleans	\$2,680,007	\$83,209	7.9%
Oklahoma City	\$1,039,178	\$31,851	5.5%
Omaha	\$618,081	\$18,272	7.0%
Orlando	\$1,398,709	\$39,214	7.6%
San Antonio	\$3,991,522	\$127,511	14.0%
St. Louis	\$3,351,054	\$104,458	15.1%
Tampa	\$3,530,768	\$103,259	10.2%
<u>Second Wave Cities (KBT Introduced July 1993)</u>			
Baltimore	\$1,256,388	\$38,199	4.7%
Detroit	\$3,186,138	\$89,451	7.0%
Washington, DC	\$3,309,137	\$92,868	6.4%
<u>Third Wave Cities (KBT Introduced May 1994)</u>			
Buffalo/Rochester	\$895,911	\$35,413	3.5%
Cincinnati	\$1,816,064	\$50,109	7.2%
Cleveland	\$1,542,599	\$46,307	4.1%
Columbus	\$587,529	\$14,224	2.9%
Denver	\$1,318,052	\$39,486	4.5%
Los Angeles	\$7,889,748	\$255,163	6.1%
Louisville	\$735,136	\$21,674	4.1%
Pittsburgh	\$1,504,396	\$43,393	4.1%
San Diego	\$861,086	\$28,390	4.3%
Syracuse	\$196,926	\$9,843	1.2%
Total	\$69,151,179		7.3%