

Market Structure and Competition in the Retail Discount Industry

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Web Appendix

In this Web Appendix, we present some additional estimation results that involve slightly different assumptions than those used to generate the results in the main text. The results in Table 5 in the main text employ the following two assumptions: the order in which firms make their store presence decisions depends on the actual entry dates; and local markets are based on combinations of census tracts that share the first three digits of their census tract numbers. In Table W1, we present results in which we assume that the order in which firms move is based on each firm's distance to its headquarters with firms that are closer to their headquarters moving first. In Table W2, we assume that local markets are based on zip codes rather than census tracts. As these tables show, the results under these alternative assumptions are not too different from those reported in the paper.

We also include Table W3 which displays information about the order of move under different market structures and different assumptions. In particular, the first column in each panel shows the frequency of different move orders based on observed entry dates as used in the paper. The second column shows the frequency of different move orders based on distance from headquarters. As can be seen from this table, the assumptions do not imply significantly different move orders.

Table W1: Estimates of the Profit Functions Using Full Market Structure Model With Strategic Interactions - Order of Moves Based on Distance from Headquarters

	Wal-Mart				Kmart				Target			
	Discount Store		Supercenter		Discount Store		Supercenter		Discount Store		Supercenter	
	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err
Market characteristic parameters												
Intercept	0.410	0.048	0.125	0.048	0.080	0.049	-0.911	0.110	-0.718	0.060	-0.806	0.106
Population	0.687	0.032	1.073	0.038	0.726	0.000	0.769	0.029	0.890	0.021	0.874	0.036
Income	-0.027	0.036	-0.285	0.042	0.138	0.035	-0.100	0.025	0.349	0.033	0.234	0.047
Childratio	0.038	0.029	0.080	0.034	-0.025	0.028	-0.040	0.034	-0.155	0.030	-0.009	0.028
Novehicle	-0.419	0.037	-0.265	0.039	-0.290	0.035	-0.194	0.062	0.104	0.044	0.016	0.073
Retail Wage	-0.258	0.042	-0.424	0.035	-0.005	0.021	-0.116	0.082	-0.142	0.028	-0.230	0.069
Tax Rate	-0.186	0.026	-0.248	0.029	-0.067	0.016	-0.196	0.025	0.010	0.016	-0.016	0.046
Num Supermarket	-0.123	0.036	-0.505	0.052	-0.212	0.025	0.085	0.029	0.054	0.036	-0.119	0.074
Electricity Price	0.228	0.080	-0.028	0.038	0.136	0.016	-0.062	0.029	-0.058	0.033	-0.253	0.055
MSA	-0.330	0.054	-0.297	0.054	-0.220	0.050	-0.480	0.114	-0.098	0.064	-0.483	0.110
Distance to HQ	-0.150	0.026	-0.412	0.036	-0.030	0.026	-0.293	0.149	-0.197	0.021	-0.072	0.028
Distance to Dist Center	-0.066	0.087	-0.211	0.060	-0.054	0.043	-0.352	0.092	-0.102	0.063	-0.478	0.107
Competitive effect parameters												
Presence of Wal-Mart Discount Store	-	-	-	-	-1.227	0.042	-1.727	0.132	-1.691	0.035	-1.912	0.107
Presence of Wal-Mart Supercenter	-	-	-	-	-1.726	0.043	-1.855	0.102	-1.446	0.063	-1.719	0.091
Presence of Kmart Discount Store	-0.763	0.043	-0.747	0.056	-	-	-	-	-1.086	0.056	-1.586	0.099
Presence of Kmart Supercenter	-0.812	0.063	-0.368	0.045	-	-	-	-	-0.368	0.157	-0.368	0.224
Presence of Target Discount Store	-0.809	0.048	-1.020	0.054	-1.223	0.041	-0.692	0.083	-	-	-	-
Presence of Target Supercenter	-0.385	0.070	-0.368	0.096	-0.495	0.089	-0.989	0.173	-	-	-	-
Std of Market-Firm Random Component	0.511	0.035			1.239	0.041			0.546	0.034		
Std of Market Random Component	2.471	0.027										
Log Likelihood	-13017.75											

Note: Estimates reflect parameters of latent profit functions in local markets for each firm and store format. All non-indicator market characteristics are standardized to have mean zero and standard deviation one. Estimates obtained by simulated maximum likelihood. Estimates differ from Table 5 in the paper in the assumed order of moves. For these results, the firms are assumed to choose their presence in an order based on distance to their respective headquarters with closer firms moving earlier.

Table W2: Estimates of the Profit Functions Using Full Market Structure Model With Strategic Interactions - Local Market Definition Based on Zip Codes

	Wal-Mart				Kmart				Target			
	Discount Store		Supercenter		Discount Store		Supercenter		Discount Store		Supercenter	
	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err	Est	Std Err
Market characteristic parameters												
Intercept	0.419	0.042	0.272	0.041	-0.214	0.041	-0.957	0.080	-0.510	0.047	-0.921	0.081
Population	0.652	0.016	0.738	0.005	0.803	0.016	0.752	0.034	0.944	0.009	0.900	0.045
Income	-0.139	0.034	-0.454	0.036	0.034	0.033	-0.156	0.051	0.357	0.034	0.240	0.054
Childratio	0.117	0.030	0.241	0.010	-0.034	0.030	0.000	0.053	0.092	0.030	0.171	0.042
Novehicle	-0.242	0.036	-0.256	0.026	-0.065	0.035	0.210	0.062	0.374	0.039	0.250	0.063
Retail Wage	-0.344	0.042	-0.496	0.039	-0.021	0.025	-0.261	0.059	0.012	0.010	-0.351	0.056
Tax Rate	0.030	0.032	0.065	0.028	-0.145	0.026	-0.127	0.055	0.029	0.028	-0.053	0.040
Num Supermarket	-0.054	0.036	-0.237	0.043	-0.026	0.032	-0.038	0.053	-0.090	0.026	-0.256	0.059
Electricity Price	0.028	0.015	0.017	0.026	0.026	0.020	-0.090	0.055	-0.114	0.034	-0.075	0.042
MSA	-0.540	0.048	0.074	0.052	-0.081	0.050	-0.303	0.090	-0.266	0.055	-0.295	0.098
Distance to HQ	-0.128	0.032	-0.271	0.032	-0.100	0.031	-0.292	0.056	-0.003	0.026	-0.053	0.047
Distance to Dist Center	-0.095	0.031	-0.209	0.033	-0.134	0.033	-0.348	0.053	0.025	0.032	0.078	0.042
Competitive effect parameters												
Presence of Wal-Mart Discount Store	-	-	-	-	-1.200	0.056	-1.794	0.161	-1.098	0.062	-1.363	0.085
Presence of Wal-Mart Supercenter	-	-	-	-	-1.315	0.047	-1.267	0.100	-1.193	0.060	-1.187	0.081
Presence of Kmart Discount Store	-0.598	0.018	-0.597	0.021	-	-	-	-	-0.938	0.044	-1.680	0.122
Presence of Kmart Supercenter	-0.518	0.031	-0.861	0.090	-	-	-	-	-0.408	0.031	-0.872	0.062
Presence of Target Discount Store	-0.380	0.011	-0.704	0.032	-0.887	0.038	-1.069	0.066	-	-	-	-
Presence of Target Supercenter	-0.471	0.028	-0.362	0.031	-0.377	0.025	-0.414	0.040	-	-	-	-
Std of Market-Firm Random Component	1.380	0.064			1.034	0.040			1.208	0.050		
Std of Market Random Component	2.493	0.062										
Log Likelihood	-9596											

Note: Estimates reflect parameters of latent profit functions in local markets for each firm and store format. All non-indicator market characteristics are standardized to have mean zero and standard deviation one. Estimates obtained by simulated maximum likelihood. Estimates differ from Table 5 in the paper in the definition of local markets. Unlike in Table 5 where markets are defined as combinations of census tracts, the estimates in this table reflect a market definition based on zip codes.

Table W3: Order of Move Under Different Assumptions

Move order	Order based on observed entry dates	Order based on distance from HQ
W,K,T	18.1%	11.6%
W,T,K	22.3%	24.2%
K,W,T	16.5%	15.8%
K,T,W	31.6%	37.3%
T,W,K	7.6%	7.4%
T,K,W	4.0%	3.7%