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AN ANALYSIS OF WAL-MART REFRIGERATED ORANGE JUICE SALES

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An Analysis of Wal-Mart Refrigerated Orange juice Sales

In this paper, estimates of the impacts of various factors on the refrigerated OJ sales in Wal-Mart (WM) stores are presented. Data on WM stores, as well as grocery stores doing \$2 million or greater annual business, across 52 Nielsen city markets (including the remaining U.S.) were studied. Since WM does not have stores in San Diego, this market was omitted. Weekly data for each city from week ending 3/11/06 through 3/01/08 (104 weeks) were included in the analysis. The relationship between WM refrigerated OJ dollar sales per store and 1) WM and \$2million store prices, \$2 million store promotions, a dummy variable to test whether sales may spike during periods when some consumers receive their paychecks (middle or end of the month), the number of same and new WM stores in the city, and seasonality variables, were studied.

Descriptive statistics of basic variables are provided in Table 1 (across all cities and weeks), and Table 2 (by city). Figure 1 illustrates an important factor of this study, that WM OJ dollar sales are inversely related to \$2 million grocery store OJ sales---higher OJ sales in WM stores tend to be associated with lower OJ sales in grocery stores and vice versa. Figures 2 and 3 illustrate the strong seasonality of OJ sales.

Model

Alternative single equation models, each representing sales across all cities, were estimated. Dummy variables were used to capture city specific impacts. Impacts of prices, promotions and other variables are common across cities. With the cities analyzed having various sizes, a log model specification was used. The impacts of changes in explanatory variables indicate percentage changes in OJ dollar sales, as opposed to dollar changes which may be more city specific.

Formally the basic model can be written as

$$(1) \quad \log(d_{it}) = \alpha_0 + \sum \alpha_i D_{it} + \beta_1 \log(p1_{it}) + \beta_2 \log(p2_{it}) + \beta_3 z1_{it} + \beta_4 z2_{it} + \beta_5 z3_{it} + \beta_6 z4_{it} \\ + \beta_7 x_{it} + \beta_8 \sin_{it} + \beta_9 \cos_{it} + \beta_{10} sn_{it} + \beta_{11} nn_{it},$$

where subscripts i and t stand for the city ($i = 1, \dots, 52$) and week ($t = 1, \dots, 104$), respectively; d is the level of refrigerated OJ dollar sales per WM store; D_i is a dummy variable for city i ($D_i=1$ if city i , otherwise $D_i=0$); $p1$ and $p2$ are OJ prices in the \$2 million and WM stores, respectively; $z1$, $z2$, $z3$ and $z4$ are the percentages of gallons sold in the \$2 million stores accompanied with features, displays, features and displays together, and price discounts, respectively; x is the payday dummy ($x=1$ if a payday week); $\sin_t = \text{sine}((2*\pi*t/52)$ and $\cos_t = \text{cosine}(2*\pi*t/52)$ are seasonality variables with $\pi = 3.141\dots$; and sn and nn are the number of same and new WM stores in the city. The α 's and β 's are coefficients to be estimated.

WM dollar sales were chosen as the dependent variable, as opposed to unit sales, since the latter is not on a single-strength-equivalent (SSE) basis---the units are of various sizes (e.g., quarts, gallons, etc.). Nevertheless, a WM OJ price, defined as total OJ dollar sales divided by total unit sales, was used in the analysis (if each unit size has a relatively constant share of the total units, this price

may be a reasonable approximation).

The coefficient on each of the two log price variables is an elasticity, indicating the percentage change in WM dollar sales for a percentage change in price. Note that if demand is inelastic an increase in price increases OJ dollar sales, while if demand is elastic, an increase in price decreases dollar sales, and vice versa. That is, the WM own-price coefficient is positive if the demand is inelastic and negative if elastic. Moreover, the WM own-price elasticity of demand is the coefficient β_2 in equation (1) minus 1. Note that the double-log specification of demand, corresponding to equation (1), can be written as $\log(q_2) = \alpha + \epsilon \log(p_2)$, where q_2 is the WM units per store, ϵ is the own-price elasticity of demand, and α stands for all other factors. Adding the term $\log(p_2)$ to each side of this equation results in $\log(d) = \alpha + (1 + \epsilon) \log(p_2)$, given $d = p_2 q_2$ and $\log(d) = \log(p_2) + \log(q_2)$. This result is the same as equation (1), letting $\beta_2 = (1 + \epsilon)$. Hence, the subtraction of 1 from β_2 to obtain the elasticity of demand.

An inverse model was also estimated where prices p_1 and p_2 were replaced by q_1 and q_2 , respectively, with q_1 being the \$2 million store SSE gallons and again q_2 being the WM units per store. Similar to the above derivation of the own-price elasticity, the own-demand flexibility for WM, indicating the percentage change in the WM price for a percentage change in the WM quantity sold, is obtained as the coefficient β_2 on the log of the WM unit variable minus 1.

Results

Estimates of equation (1) are shown in Table 3, while estimates of this equation with the price variables replaced by the corresponding quantity variables are shown in Table 4. There are two sets of results in each table. One set includes all the promotional variables as specified in equation (1), while the other set replaces these variables with the variable $z = z_1 + z_2 + z_3 + z_4$. That is, z is the overall share of gallons promoted in the \$2 million stores.

The coefficient estimates for the city dummy variables indicate various differences in WM OJ sales across cities (Tables 3 and 4). The seasonality coefficient estimates across the regressions in the two tables also reflect the seasonal pattern in WM OJ sales illustrated in Figure 3.

Focusing on the remaining variables, the results in Table 3 are first reviewed. The coefficient on the payday dummy variable indicates that WM OJ dollar sales increase by about 2% during a payday week (Table 3). It should be noted that the payday dummy roughly approximates the period when consumers get their paychecks; it is not known what percentage of the consumers get paid during the periods indicated by the payday dummy. Thus, this variable may be capturing the effects of other unknown collinear variables. Nevertheless, WM sales appear to increase in the middle and end of the month as reflected by this dummy variable.

The coefficient estimates for the numbers of WM stores indicate that increases in the number of same and new stores in a city moderately result in a decline in per-store OJ sales, apparently reflecting some competition between stores.

The own-price coefficient estimates indicate that the WM own-price elasticity is about -.36 to -

39 (the corresponding coefficients in Table 3 minus 1). The cross-price coefficient is positive and significant indicating price competition between WM and \$2 million stores---as the price in the \$2 million stores increases, WM sales increase, and vice versa. The cross-price impact, however, is not large, indicating that a 10% change in the \$2 million store price results in a .5% to .9% change in WM sales.

Additional competition between WM and \$2 million stores is reflected by the coefficient estimates for some, but not all, of the promotional variables. \$2 million store price discounts (z_4) and promotions in general (z) have negative impacts on WM OJ sales. Based on the individual promotional tactic estimates in Table 3, Regression 2, price discounts in \$2 million stores reduce WM sales by about 9%. On the other hand, the coefficients for deals and features are positive, suggesting possible generic effects. The coefficient for features, however, is insignificant, but those for deals and deals and features together are significant. Overall, competitive and generic promotions together as captured by variable z (Regression 1 in Table 3) result in a 3% decrease in WM OJ sales.

Treating prices as exogenous, as in the Table 3, is consistent with the view that prices in a week are fixed and consumers can purchase as much as desired at the given prices. Alternatively, to examine the robustness of the findings, we treat quantities as exogenous, replacing prices by quantities in equation (1). Estimates for this specification are provided in Table 4. These results are not meant to replace those in Table 3, given the assumption that quantities are exogenous is not acceptable; the alternative estimates are simply provided to examine the robustness of the findings. In Table 4, the coefficient estimates on gallon sales in \$2 million stores are negative directly indicating competition, while those on the WM quantity are positive indicating a flexibility of $-.12 (.88-1)$ ---a 1.2% change in the WM price in response to a 10% change in the WM units. Generally, the promotional variables have similar impacts as shown in Table 3. The overall promotion coefficient is negative indicating competition. The results for features alone, and features and displays together are similar to those in Table 3, but displays alone now have a negative impact. The seasonality estimates in Table 4 are similar to those in Table 3, but the payday coefficient in Table 4 is now negative and the numbers of same and new WM stores now have positive impacts. Overall, the results of Tables 3 and 4 indicate a general robustness in findings, particularly those reflecting competition between \$2 million and WM stores.

Assuming the treatment of prices as exogenous is more accurate than that of treating quantities as exogenous, the findings of this study are summarized by focusing on the results in Table 3. First, WM refrigerated OJ demand was found to be relatively price inelastic with an own-price elasticity in the range of $-.36$ to $-.39$. Second, the cross-price elasticity, with respect to the \$2 million store price for OJ, although not large, is significantly different from zero and positive indicating price competition between stores. Third, additional competition was found to occur through promotions in the \$2 million stores. Price discounts were estimated to reduce WM OJ sales by about 9%. It appears, however, that some promotions may have a generic impact. Overall across tactics, \$2 million store OJ promotions were found to reduce WM sales by about 3%. Other results indicate that OJ sales increase by about 2% during payday periods, increasing the number of WM stores in a city may slightly reduce per-store OJ sales, and sales over time are subject to seasonality.

Table 1. Descriptive Statistics, across 52 Cities including remaining U.S. (excludes San Diego), 3/11/06 through 3/01/08.

Variable	N	Mean	Std Dev	Minimum	Maximum
\$2 Mil. Refrig. OJ SSE Ga. Sales	5408	173,890	237,181	22,704	1,937,971
\$2 Mil. Refrig. OJ \$ Sales	5408	990,876	1,333,475	136,918	10,237,448
Wal-Mart Refrig. OJ Unit Sales	5408	57,461	128,275	1,813	1,122,059
Wal-Mart Refrig. OJ \$ Sales	5408	4,161	1,545	1,211	10,818
\$2 Mil. Refrig. \$/SSE Ga.	5408	5.67	0.69	3.61	7.81
Wal-Mart Refrig. \$/Unit	5408	3.05	0.33	2.43	3.78
\$2 Mil. SSE Ga. Sales W Promo	5408	88,043	126,049	3,082	1,005,838
\$2 Mil. SSE Ga. Sales W Feature	5408	43,691	74,176	260	659,112
\$2 Mil. SSE Ga. Sales W Display	5408	4,065	6,423	-	59,784
\$2 Mil. SSE Ga. Sales W Feature & Display	5408	9,240	12,773	-	100,420
\$2 Mil. SSE Ga. Sales W Price Discount	5408	31,046	43,346	808	405,974
Number of Wal-Mart Stores	5408	44.95	109.34	2.00	827.00
Number of Wal-Mart Same Stores	5408	43.83	109.36	2.00	827.00
Number of Wal-Mart New Stores	5408	1.13	2.11	0.00	14.00
Payday (1=payday; else 0)	5408	0.46	0.50	0.00	1.00

Table 2. Sample Means, by 52 City including remaining U.S. (excludes San Diego), 3/11/06 through 3/01/08.

City	\$2 Mil. Refrig. OJ						Wal-Mart Refrig. OJ Sales					
	OJ SSE Ga. Sales	OJ \$ Sales	Feature SSE Ga.	Display SSE Ga.	Feature & Display SSE Ga.	Price Discount SSE Ga.	Same Store \$ Sales	Same Store Unit Sales	New Store \$ Sales	New Store Unit Sales	No. of Same Stores	No. of New Stores
ALBANY	80493	446273	20773	3839	7405	10559	63122	20755	1760	537	11	1
ATLANTA	183582	1014043	36138	2232	1950	27250	287274	96102	25582	8223	67	9
BALTIMORE	123007	718629	28256	5114	17467	23683	13191	4357	722	223	4	0
BIRMINGHAM	66028	345771	7796	553	321	7176	217671	74785	6238	1989	58	3
BOSTON	424005	2388935	109626	10798	22976	74042	56065	18166	1807	539	13	1
BUFFALO/ROCHESTER	119868	627412	18679	4457	11737	10773	52397	18339	4223	1360	13	2
CHARLOTTE	79927	451469	13377	4102	7699	14026	98946	34271	8626	2881	24	3
CHICAGO	316257	1780926	78763	26345	42084	83998	27956	8836	10667	3218	8	4
CINCINNATI	119092	610664	27296	2284	5928	22374	67241	21790	5821	1817	29	4
CLEVELAND	154786	851823	30872	7027	16797	17914	83925	27954	7286	2273	26	4
COLUMBUS	78974	398510	17137	3744	4664	11892	90795	29910	5089	1571	28	3
DALLAS/FT. WORTH	129522	710488	24289	3103	4422	26754	359397	113095	13499	3996	81	5
DENVER	118677	721098	21706	2887	5894	31941	149837	46715	8985	2650	39	5
DES MOINES	32487	170360	3184	1398	488	4872	37981	12579	2158	698	15	1
DETROIT	217191	1161696	52759	5849	16510	32467	47473	15574	4120	1344	23	3
GRAND RAPIDS	78836	420309	25827	876	6278	10351	51979	17251	2148	701	20	2
HARTFORD/NEW HAVEN	140312	821237	55054	1688	16934	26139	33372	11014	0	0	6	0
HOUSTON	152188	793928	23032	2248	3220	28453	243035	78818	6437	2048	57	3
INDIANAPOLIS	92125	487120	19427	1118	3235	20177	142629	45845	13111	4105	36	5
JACKSONVILLE	56427	327853	13023	728	705	7938	78497	26864	6927	2274	20	2
KANSAS CITY	64824	357293	10471	2355	2413	7913	103947	33034	5061	1486	32	0
LAS VEGAS	52608	296920	12162	351	1014	12091	58473	18308	8200	2371	10	0
LITTLE ROCK	31392	165040	6236	245	296	5100	131592	42718	0	0	39	0
LOS ANGELES	498307	2971374	114022	4142	11198	118055	41101	13011	11185	3387	11	0
LOUISVILLE	71712	357708	11755	2339	4355	9848	122070	40786	2719	820	36	0
MEMPHIS	48880	251673	8011	509	481	8907	140115	47151	0	0	47	0
MIAMI	267340	1640853	66494	1135	1040	37361	153961	51662	18266	5822	19	0
MILWAUKEE	80006	446584	15770	4170	11352	12882	44982	14362	0	0	12	0
MINNEAPOLIS	128560	742045	23456	6027	13601	24368	54642	17412	1776	525	21	0
NASHVILLE	77284	400891	10645	2802	4707	10157	164335	53965	2035	598	47	0

Table 2 cont'd.

City	\$2 Mil. Refrig. OJ						Wal-Mart Refrig. OJ Sales					
	OJ SSE Ga. Sales	OJ \$ Sales	Feature SSE Ga.	Display SSE Ga.	Feature & Display SSE Ga.	Price Discount SSE Ga.	Same Store \$ Sales	Same Store Unit Sales	New Store \$ Sales	New Store Unit Sales	No. of Same Stores	No. of New Stores
NEW ORLEANS/MOBILE	79304	459479	10032	1220	1253	13210	309141	101473	3150	961	63	0
NEW YORK	793032	4763044	418111	4359	37029	130160	20965	6730	0	0	3	0
OKLAHOMA CITY/TULSA	59573	341149	12153	407	705	8307	176308	56131	3082	969	57	0
OMAHA	39661	188220	7417	917	933	5566	57364	18589	1183	346	15	0
ORLANDO	111471	657428	27716	1101	1491	14977	261792	91806	6160	1988	36	0
PHILADELPHIA	372504	2081969	140458	4499	31560	54485	92425	31035	2533	802	16	0
PHOENIX	162005	956390	39467	2238	4889	41158	180733	57304	13678	4016	47	0
PITTSBURGH	131810	717171	26074	8450	12551	15551	173440	58142	3089	978	39	0
PORTLAND	97861	613066	25418	3260	5368	25045	28815	9455	0	0	11	0
RALEIGH/DURHAM	127170	724002	21260	4965	9361	24849	192242	66668	11073	3744	46	0
RICHMOND/NORFOLK	113734	656228	21287	3440	5553	17834	201503	68876	6772	2178	34	0
SACRAMENTO	94543	598891	26367	2009	4796	19169	20301	6833	6617	2155	4	0
ST. LOUIS	96749	551231	16039	4031	8881	18706	95207	31045	0	0	34	0
SALT LAKE CITY/BOISE	81891	465429	17561	1561	1954	14129	148205	47543	4756	1410	41	0
SAN ANTONIO	124366	592073	17318	1381	1441	11750	112429	37367	5870	1853	38	0
SAN FRANCISCO	211246	1480592	60058	2934	7627	65391	8028	2429	0	0	3	0
SEATTLE	123617	790121	30328	3897	7355	36350	23307	7298	3321	978	8	0
SYRACUSE	78782	426879	17381	1402	2733	8765	71298	24428	0	0	17	0
TAMPA	187223	1138847	42334	1465	1329	24949	258076	89565	16086	5431	44	0
WASHINGTON D.C.	275668	1650960	69765	7243	23614	58724	116326	39099	5101	1619	23	0
WEST TEXAS	29650	174074	3199	205	650	6400	142189	44674	3642	1078	34	0
REMAINING U.S.	1565714	8619388	316167	35932	62256	259467	2796596	926660	68635	21445	814	0

Figure 1. Dollar Sales: Wal-Mart Vs. \$2 Million, By City

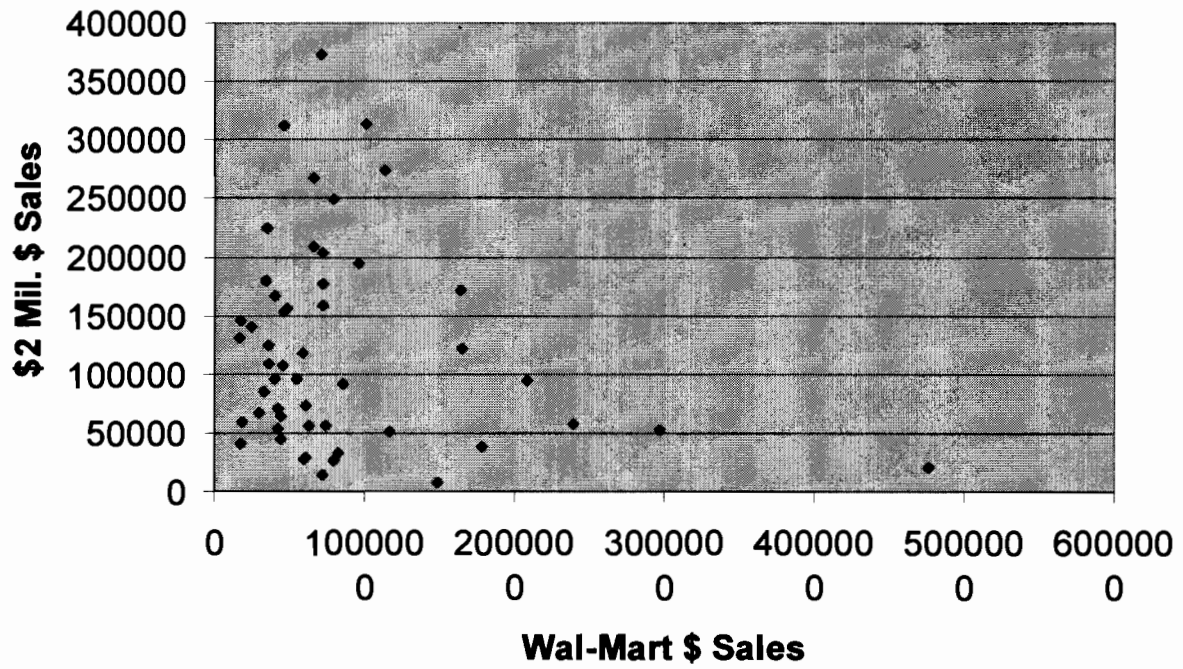
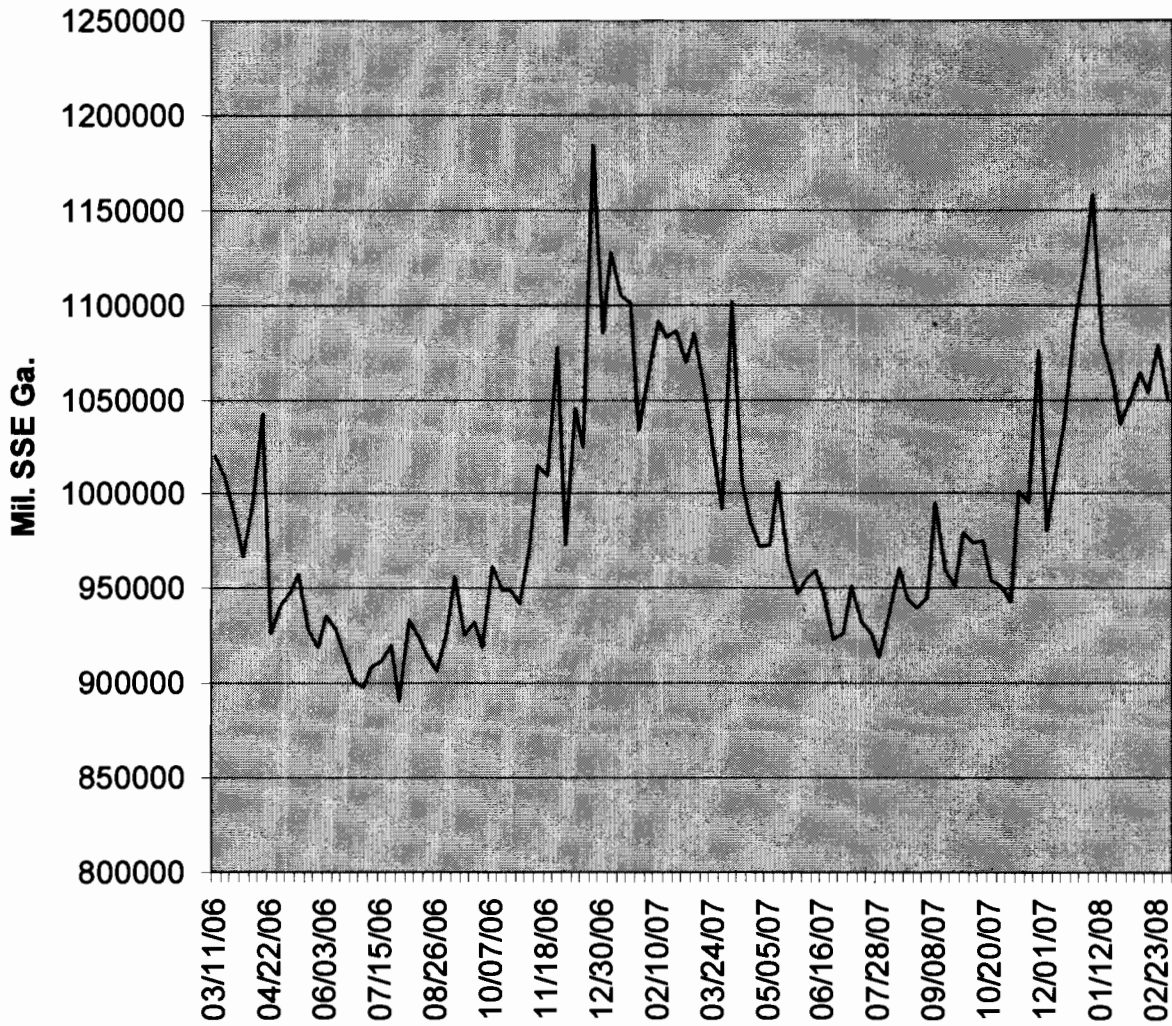


Figure 2. \$2Mil. Store OJ Dollar Sales, By Week (All Cities)



**Figure 3. Wal-Mart OJ Dollar Sales,
By Week (All Cities)**

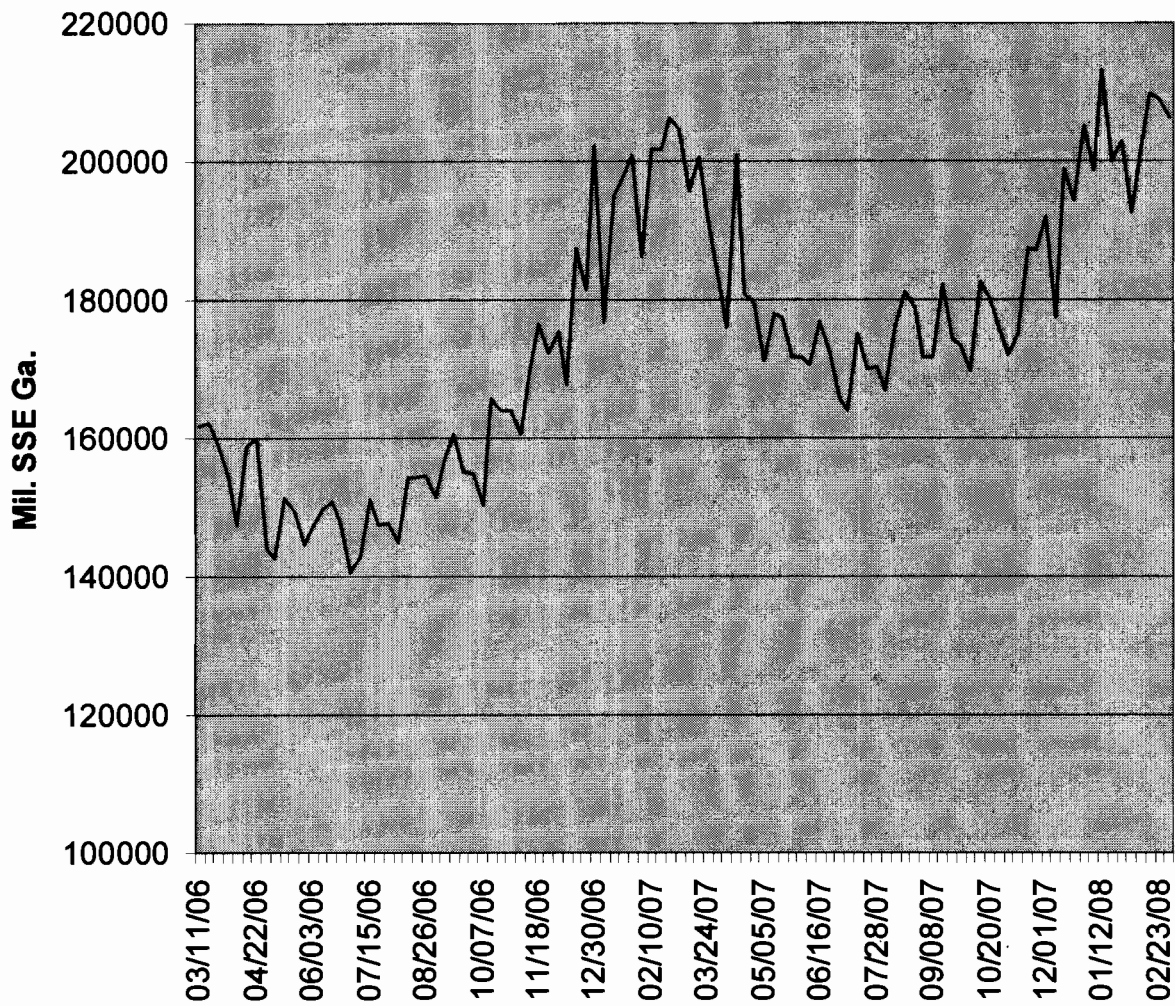


Table 3. OLS Regression Estimates for Direct Demand Revenue Specification: Based on 52 Cities (Incl. Remaining U.S.) times 104 observations per city—5408 total observations.

Dependent Variable: Log of Wal-Mart Dollar Sales Per Store: (same + new store \$ sales)/(number of same stores + number of same stores)

Independent Variable	Regression 1				Regression 2			
	Parameter Est.	Standard Error	t Value	Pr > t	Parameter Est.	Standard Error	t Value	Pr > t
Intercept (Remaining U.S)	12.4112	1.0234	12.130	<.0001	12.3585	1.0210	12.100	<.0001
city1	-4.5108	1.0120	-4.460	<.0001	-4.5229	1.0096	-4.480	<.0001
city2	-4.3848	0.9410	-4.660	<.0001	-4.3750	0.9387	-4.660	<.0001
city3	-5.1531	1.0209	-5.050	<.0001	-5.1684	1.0185	-5.070	<.0001
city4	-4.5925	0.9520	-4.820	<.0001	-4.5809	0.9497	-4.820	<.0001
city5	-4.7869	1.0095	-4.740	<.0001	-4.7883	1.0071	-4.750	<.0001
city6	-4.8560	1.0092	-4.810	<.0001	-4.8646	1.0068	-4.830	<.0001
city7	-4.7264	0.9952	-4.750	<.0001	-4.7350	0.9928	-4.770	<.0001
city8	-5.0655	1.0157	-4.990	<.0001	-5.0792	1.0133	-5.010	<.0001
city9	-5.3009	0.9890	-5.360	<.0001	-5.2934	0.9866	-5.370	<.0001
city10	-4.9891	0.9927	-5.030	<.0001	-5.0007	0.9903	-5.050	<.0001
city11	-4.9591	0.9904	-5.010	<.0001	-4.9595	0.9880	-5.020	<.0001
city12	-4.3191	0.9233	-4.680	<.0001	-4.3095	0.9211	-4.680	<.0001
city13	-4.7667	0.9766	-4.880	<.0001	-4.7589	0.9742	-4.880	<.0001
city14	-5.2718	1.0072	-5.230	<.0001	-5.2628	1.0048	-5.240	<.0001
city15	-5.4622	0.9967	-5.480	<.0001	-5.4654	0.9943	-5.500	<.0001
city16	-5.2500	1.0005	-5.250	<.0001	-5.2556	0.9980	-5.270	<.0001
city17	-4.5408	1.0185	-4.460	<.0001	-4.5558	1.0160	-4.480	<.0001
city18	-4.4979	0.9539	-4.720	<.0001	-4.4841	0.9516	-4.710	<.0001
city19	-4.7165	0.9799	-4.810	<.0001	-4.7045	0.9775	-4.810	<.0001
city20	-4.7960	1.0004	-4.790	<.0001	-4.7932	0.9979	-4.800	<.0001
city21	-4.9122	0.9852	-4.990	<.0001	-4.9108	0.9828	-5.000	<.0001
city22	-4.3463	1.0138	-4.290	<.0001	-4.3345	1.0113	-4.290	<.0001
city23	-4.8496	0.9767	-4.970	<.0001	-4.8381	0.9743	-4.970	<.0001
city24	-4.7211	1.0122	-4.660	<.0001	-4.7127	1.0097	-4.670	<.0001
city25	-4.8153	0.9808	-4.910	<.0001	-4.8121	0.9784	-4.920	<.0001
city26	-4.8993	0.9667	-5.070	<.0001	-4.8857	0.9644	-5.070	<.0001
city27	-3.9739	1.0021	-3.970	<.0001	-3.9718	0.9996	-3.970	<.0001
city28	-4.9228	1.0108	-4.870	<.0001	-4.9377	1.0084	-4.900	<.0001
city29	-5.2194	0.9991	-5.220	<.0001	-5.2271	0.9967	-5.240	<.0001
city30	-4.7495	0.9663	-4.920	<.0001	-4.7483	0.9640	-4.930	<.0001
city31	-4.3116	0.9470	-4.550	<.0001	-4.3032	0.9447	-4.560	<.0001
city32	-4.3475	1.0223	-4.250	<.0001	-4.3589	1.0198	-4.270	<.0001
city33	-4.8312	0.9538	-5.070	<.0001	-4.8243	0.9515	-5.070	<.0001
city34	-4.8522	1.0069	-4.820	<.0001	-4.8409	1.0044	-4.820	<.0001
city35	-4.0316	0.9805	-4.110	<.0001	-4.0316	0.9781	-4.120	<.0001
city36	-4.4095	1.0056	-4.390	<.0001	-4.4202	1.0031	-4.410	<.0001
city37	-4.6088	0.9674	-4.760	<.0001	-4.6011	0.9651	-4.770	<.0001
city38	-4.5331	0.9768	-4.640	<.0001	-4.5465	0.9745	-4.670	<.0001

Table 3 cont'd.

Independent Variable	Regression 1				Regression 2			
	Parameter Est.	Standard Error	t Value	Pr > t	Parameter Est.	Standard Error	t Value	Pr > t
city39	-5.2484	1.0126	-5.180	<.0001	-5.2514	1.0101	-5.200	<.0001
city40	-4.4986	0.9678	-4.650	<.0001	-4.5023	0.9655	-4.660	<.0001
city41	-4.2561	0.9831	-4.330	<.0001	-4.2581	0.9807	-4.340	<.0001
city42	-4.3714	1.0210	-4.280	<.0001	-4.3770	1.0185	-4.300	<.0001
city43	-5.0681	0.9830	-5.160	<.0001	-5.0730	0.9806	-5.170	<.0001
city44	-4.7480	0.9743	-4.870	<.0001	-4.7428	0.9719	-4.880	<.0001
city45	-4.9201	0.9779	-5.030	<.0001	-4.9070	0.9755	-5.030	<.0001
city46	-5.2434	1.0229	-5.130	<.0001	-5.2409	1.0204	-5.140	<.0001
city47	-5.0914	1.0161	-5.010	<.0001	-5.0912	1.0136	-5.020	<.0001
city48	-4.7451	1.0041	-4.730	<.0001	-4.7451	1.0017	-4.740	<.0001
city49	-4.1723	0.9704	-4.300	<.0001	-4.1712	0.9680	-4.310	<.0001
city50	-4.4809	0.9970	-4.490	<.0001	-4.4875	0.9946	-4.510	<.0001
city51	-4.6694	0.9832	-4.750	<.0001	-4.6557	0.9808	-4.750	<.0001
Log \$2 Mil. Price	0.0511	0.0359	1.430	0.1541	0.0938	0.0366	2.560	0.01
Log WM Price	0.6373	0.0317	20.120	<.0001	0.6091	0.0320	19.010	<.0001
Promo Share of \$2 Mil. Ga.	-0.0301	0.0183	-1.650	0.0996				
Features Share of \$2 Mil. Ga.					0.0119	0.0234	0.510	0.61
Display Share of \$2 Mil. Ga.					0.1316	0.0808	1.630	0.10
Fea./Disp. Sh. of \$2 Mil. Ga.					0.1018	0.0487	2.090	0.04
Disc. Share of \$2 Mil. Ga.					-0.0912	0.0220	-4.140	<.0001
Pay Day	0.0187	0.0023	8.270	<.0001	0.0200	0.0023	8.810	<.0001
Sine (seasonality)	-0.0697	0.0017	-41.850	<.0001	-0.0707	0.0017	-41.920	<.0001
Cosine (seasonality)	0.0619	0.0017	37.340	<.0001	0.0620	0.0017	37.410	<.0001
Number of Same Stores	-0.0062	0.0013	-4.910	<.0001	-0.0062	0.0013	-4.920	<.0001
Number of New Stores	-0.0084	0.0013	-6.260	<.0001	-0.0087	0.0013	-6.490	<.0001
R-Square	0.9441				R-Square	0.9444		

Table 4. OLS Regression Estimates for Inverse Demand Revenue Specification: Based on 52 Cities (Incl. Remaining U.S.) times 104 observations per city—5408 total observations.

Dependent Variable: Log of Wal-Mart Dollar Sales Per Store: (same + new store \$ sales)/(number of same stores + number of same stores)

Independent Variable	Regression 3				Regression 4			
	Parameter Est.	Standard Error	t Value	Pr > t	Parameter Est.	Standard Error	t Value	Pr > t
Intercept (Remaining U.S)	5.9114	0.8167	7.240	<.0001	6.1989	0.8124	7.630	<.0001
city1	3.0551	0.7759	3.940	<.0001	2.9343	0.7709	3.810	0.000
city2	3.0172	0.7207	4.190	<.0001	2.9216	0.7161	4.080	<.0001
city3	3.2837	0.7824	4.200	<.0001	3.1649	0.7774	4.070	<.0001
city4	2.5147	0.7307	3.440	0.001	2.4023	0.7260	3.310	0.001
city5	4.0537	0.7718	5.250	<.0001	3.9605	0.7668	5.160	<.0001
city6	3.1502	0.7735	4.070	<.0001	3.0338	0.7685	3.950	<.0001
city7	2.8282	0.7633	3.710	0.000	2.7145	0.7584	3.580	0.000
city8	3.8330	0.7771	4.930	<.0001	3.7419	0.7721	4.850	<.0001
city9	3.0220	0.7585	3.980	<.0001	2.9133	0.7536	3.870	0.000
city10	3.2199	0.7606	4.230	<.0001	3.1086	0.7558	4.110	<.0001
city11	2.8286	0.7598	3.720	0.000	2.7157	0.7550	3.600	0.000
city12	2.8430	0.7077	4.020	<.0001	2.7456	0.7032	3.900	<.0001
city13	3.0438	0.7485	4.070	<.0001	2.9431	0.7437	3.960	<.0001
city14	2.3517	0.7741	3.040	0.002	2.2328	0.7692	2.900	0.004
city15	3.4282	0.7635	4.490	<.0001	3.3226	0.7586	4.380	<.0001
city16	2.8526	0.7677	3.720	0.000	2.7240	0.7628	3.570	0.000
city17	3.4427	0.7799	4.410	<.0001	3.3170	0.7749	4.280	<.0001
city18	3.1161	0.7308	4.260	<.0001	3.0186	0.7261	4.160	<.0001
city19	2.8747	0.7515	3.830	0.000	2.7654	0.7467	3.700	0.000
city20	2.6660	0.7677	3.470	0.001	2.5455	0.7628	3.340	0.001
city21	2.7722	0.7560	3.670	0.000	2.6573	0.7512	3.540	0.000
city22	2.8838	0.7777	3.710	0.000	2.7641	0.7727	3.580	0.000
city23	2.2577	0.7508	3.010	0.003	2.1315	0.7460	2.860	0.004
city24	4.2080	0.7735	5.440	<.0001	4.1222	0.7685	5.360	<.0001
city25	2.7731	0.7526	3.680	0.000	2.6577	0.7478	3.550	0.000
city26	2.4417	0.7425	3.290	0.001	2.3254	0.7378	3.150	0.002
city27	3.8075	0.7661	4.970	<.0001	3.7086	0.7612	4.870	<.0001
city28	3.0300	0.7752	3.910	<.0001	2.9065	0.7703	3.770	0.000
city29	3.2289	0.7658	4.220	<.0001	3.1196	0.7609	4.100	<.0001
city30	2.7661	0.7414	3.730	0.000	2.6535	0.7366	3.600	0.000
city31	2.7348	0.7263	3.770	0.000	2.6280	0.7216	3.640	0.000
city32	4.5951	0.7803	5.890	<.0001	4.4972	0.7753	5.800	<.0001
city33	2.5548	0.7323	3.490	0.001	2.4378	0.7276	3.350	0.001
city34	2.5685	0.7733	3.320	0.001	2.4442	0.7684	3.180	0.002
city35	3.0972	0.7511	4.120	<.0001	2.9861	0.7463	4.000	<.0001
city36	3.9817	0.7687	5.180	<.0001	3.8743	0.7638	5.070	<.0001
city37	3.2894	0.7409	4.440	<.0001	3.1907	0.7362	4.330	<.0001
city38	3.1623	0.7484	4.230	<.0001	3.0547	0.7437	4.110	<.0001

Table 4 cont'd.

Independent Variable	Regression 1				Regression 2			
	Parameter Est.	Standard Error	t Value	Pr > t	Parameter Est.	Standard Error	t Value	Pr > t
city39	3.1016	0.7764	4.000	<.0001	2.9920	0.7714	3.880	0.000
city40	3.0641	0.7416	4.130	<.0001	2.9602	0.7369	4.020	<.0001
city41	3.1205	0.7531	4.140	<.0001	3.0124	0.7483	4.030	<.0001
city42	3.2053	0.7823	4.100	<.0001	3.0893	0.7772	3.970	<.0001
city43	2.9664	0.7538	3.940	<.0001	2.8553	0.7490	3.810	0.000
city44	2.8718	0.7473	3.840	0.000	2.7606	0.7425	3.720	0.000
city45	3.0984	0.7496	4.130	<.0001	2.9913	0.7448	4.020	<.0001
city46	3.7137	0.7830	4.740	<.0001	3.6159	0.7779	4.650	<.0001
city47	3.3305	0.7785	4.280	<.0001	3.2259	0.7735	4.170	<.0001
city48	2.9422	0.7701	3.820	0.000	2.8229	0.7651	3.690	0.000
city49	3.3576	0.7427	4.520	<.0001	3.2563	0.7379	4.410	<.0001
city50	3.7387	0.7626	4.900	<.0001	3.6383	0.7577	4.800	<.0001
city51	2.3158	0.7555	3.070	0.002	2.1929	0.7507	2.920	0.004
Log \$2 Mil. Ga.	-0.6237	0.0109	-57.040	<.0001	-0.6386	0.0111	-57.540	<.0001
Log WM Units Per Store	0.8824	0.0104	84.490	<.0001	0.8821	0.0104	84.980	<.0001
Promo Share of \$2 Mil. Ga.	-0.0097	0.0133	-0.730	0.465				
Features Share of \$2 Mil. Ga.					0.0264	0.0174	1.520	0.128
Display Share of \$2 Mil. Ga.					-0.2022	0.0609	-3.320	0.001
Fea./Disp. Sh. of \$2 Mil. Ga.					0.1208	0.0362	3.330	0.001
Disc. Share of \$2 Mil. Ga.					-0.0668	0.0164	-4.080	<.0001
Payday	-0.0094	0.0018	-5.310	<.0001	-0.0082	0.0018	-4.670	<.0001
Sine (seasonality)	-0.0411	0.0014	-29.060	<.0001	-0.0422	0.0014	-29.260	<.0001
Cosine (seasonality)	0.0655	0.0014	46.730	<.0001	0.0667	0.0014	47.550	<.0001
Number of Same Stores	0.0061	0.0010	6.290	<.0001	0.0060	0.0010	6.240	<.0001
Number of New Stores	0.0197	0.0010	19.860	<.0001	0.0195	0.0010	19.750	<.0001
R-Square	0.9673				R-Square	0.9678		