COMPARING BUSINESS CONCENTRATION OF THE GENERAL MERCHANDISERS INDUSTRY WITH OTHER INDUSTRIES

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ABSTRACT

Using indexes of concentration, the general merchandisers industry was compared with other consumer product and/or retailing industries, such as food and drug stores, for the period 1995 to 2006. This paper shows that an increase in concentration occurred in the general merchandisers industry. Compared to other industries, the general merchandisers industry had statistically significant concentration. Thus, fears of monopolization power in the general merchandisers industry may be warranted. The increase in concentration can be attributed mainly to the increase in market share of Wal-Mart.

INTRODUCTION

When dealing with markets such as banking, insurance, health care, food and drug stores and general merchandisers, a framework requires the identification of major characteristics within such markets (Bain 1959; Scherer and Ross 1990). The major characteristics include the degree of concentration, the degree of product differentiation and the ease of entry of new firms into the market. Cartelization and oligopolistic behavior are feared when industry concentration is high, while unconcentrated industries are favored because they are competitive, promoting efficient pricing. Demsetz (1973), however, turns the argument around by presuming that corporate bigness and high industry concentration are consequences of efficiency in production at the lowest cost. Of special interest in this research is the degree of concentration in the general merchandisers industry due to Wal-Mart's presence in the group. Arguments go that high concentration may significantly reduce the choices of consumers. This means that a small number of firms dominate the market for daily services, a special concern to the antitrust department of the Federal Trade Commission.

In Britain, according to Rohwedder (2006), antitrust concerns generated an investigation of the largest supermarket chains. The largest of these was Tesco, controlling approximately 31 percent of market share, followed by Wal-Mart, then Britain's Asda chain, which holds a16-percent market share. In the United States, the bigness of Wal-Mart spawns other types of discussion, according to Green (2006). Green explains that Wal-Mart's war on prices helps check inflation in the United States. At the same time, Wal-Mart is accused of outsourcing manufacturing and jobs to other countries, thus driving wages and benefits down. The new focus of criticism of Wal-Mart concerns its policy of health care for workers in that only about half its

workers are covered with health benefits. The rest are cared for by government programs such as Medicaid.

The purpose of this paper is to construct indexes of concentration for the general merchandisers industry for comparison with other industries between 1995 and 2006. The methodology of this research is inspired by Rhoades (1982), who compared the concentration of the banking industry of six countries (U.S., Canada, France, Germany, Japan, UK) by calculating deposits-to-sales ratios of the largest banks in a country to the largest corporations, irrespective of the nature of their outputs. Rhoades calculated for each of five countries the ratio of the largest bank with the largest corporation, making the comparisons for the 5, 10 and 20 largest. This paper, however, goes further than Rhoades by actually computing concentration indexes of six other related industries that deal with consumer products and/or retailing. By choosing related industries, a better picture emerges on the extent of concentration in the general merchandisers industry relative to other industries.

The concern of this paper is measuring sales concentration in the general merchandisers industry to determine Wal-Mart's market power among the group of major companies in which Wal-Mart is a member. A great deal of literature is devoted to the power of Wal-Mart bringing downward pressure on the prices of everyday necessities, downward pressure on wages, downward pressure on profits and relentless cost-cutting. According to Fishman (2006), with Wal-Mart operating virtually in every corner of this country resulting in increases in sales every year, it is of interest to find out if the level of concentration in the general merchandisers industry has been increasing due to Wal-Mart at a level that is statistically significant, a topic that has not been researched.

Fishman provides statistics for the spread of Wal-Mart throughout the United States to show the extent of its selling as well as buying power. With a total population in the United States of 293 million and 110 million households in the year in which the analysis was made, some 155 million residents or 59 million households live within five miles of a Wal-Mart store. Within 15 miles, the corresponding numbers are 265 and 99 million. Within 25 miles, the numbers are 285 and 107. According to Wal-Mart, as cited by Fishman, 100 million people shop at their stores in the United States each week.

DATA

The data on the general merchandisers industry for the period 1995-2006, as well as on the other industries, were obtained from *Fortune,* which each year since 1995 has provided information on the 1,000 largest companies, including service industries. There are some 62 industries included among the 1,000 companies, classified according to type. The companies comprising the 62 industries are ranked by revenue (Fortune 2006). The choice of the six other industries in this research is motivated by the idea that these industries engage in consumer products and/or retailing, as was done in a similar way by Dunning and Pearce (1985), making seven total industries under consideration. For ease of presentation, the seven industries are denoted by $G_1, G_2, \ldots, G_7$, as follows:

G_1: General Merchandisers
G_2: Apparel
G_3: Food and Drugstores
G_4: Food Consumer Products

G_5:   Household and Personal Products
G_6:   Pharmaceuticals
G_7:   Specialty Retailers

ANALYTICAL MODELS

According to Hannah and Kay (1977), the most commonly used measures of concentration are the Herfindahl index (H), the coefficient of variation (CV), the standard deviation (S) and, by implication, the variance (S^2) and the k firm concentration ratio (usually k=4) denoted by CR4. For purposes of contrast, measurement of concentration among the chosen industries in this work was undertaken with the use of the four-firm concentration ratio (CR4), the coefficient of variation and the well known Herfindahl index (H). The Herfindahl index is used in the Merger Guidelines by the Department of Justice Antitrust Division of the Federal Trade Commission in merger and monopolization cases (Rhoades 1995).

The Herfindahl index is defined as the sum of the squared market shares of the firms in an industry. By letting P_i=the ith firm's total revenue share of an industry, i=1,...,n; the H index weights each P_i share by itself, then sums the squares. That is

$$H = \sum_{i=1}^{n} P_i^2 , i = 1,...,n, \frac{1}{n} \leq H \leq 1.00 \quad . \tag{1}$$

When all shares are held by one company, the case of monopoly, H=1.00; when all shares are held equally by all the companies, H=l/n. A "numbers equivalent"

$$m = \frac{1}{H} \tag{2}$$

for a given H for n firms each with market share l/n, the index will correspond to m equally sized firms. There is a relationship between H and CV, the coefficient of variation $[S / \overline{P}]$ where

$$CV = \frac{S}{\overline{P}} , \tag{3}$$

and where

$$\overline{P} = \sum_i \frac{P_i}{n} = \frac{1}{n} ,$$

and

$$S = \left[\frac{\sum_i \left(P_i - \overline{P}\right)^2}{n} \right]^{\frac{1}{2}}.$$

This relationship according to Clarke (1985) is

$$(CV)^2 = nH - 1,$$ 4)

which is indirectly useful for testing a hypothesis of equality of variances. The ratio

$$R = \frac{(CV)_i^2}{(CV)_j^2},$$ (5)

where i and j denote for a given industry two different time periods. In essence, the ratio R of equation (5) is reduced to a ratio

$$F^* = \frac{S_i^2}{S_j^2}$$ (6)

because $\overline{P} = 1/n$ is approximately the same for all industries and for all time periods which in effect cancels out in equation (5). That is, for two time periods, i and j, each consisting of n companies,

$$R = \frac{(CV)_i^2}{(CV)_j^2}$$
$$= \frac{\dfrac{S_i^2}{\overline{P}_j^2}}{\dfrac{S_j^2}{\overline{P}_j^2}}.$$ (7)

Since $\overline{P}_i \cong \overline{P}_j \cong \dfrac{1}{n}$, $\overline{P}_i$ and $\overline{P}_j$ in essence cancel out with the result for this special case

$$R = \frac{(CV)_i^2}{(CV)_j^2}$$

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$$\cong \frac{S_i^2}{S_j^2}.$$ (8)

Also, as indicated in the Analytical Models section, the variance S^2 is often used as a measure of concentration in its own right. Therefore, the use of the F-distribution for testing equality of two variances is legitimate for testing equality of concentration. The computed F* of equation (6) is compared with tabular $F(\alpha, n_i\text{-}1, n_j\text{-}1)$, where α is the significance level of the test and $n_i\text{-}1$ and $n_j\text{-}1$ are the degrees of freedom associated with industries i and j, respectively, when F>1. For a significance level α=0.05 and for n_i=n_j= 17, for example, the tabular value is $F(0.05, 16, 16) \cong 2.35$. Thus, if F*>2.35, it can be concluded that the concentration of period i is statistically significant at the 5 percent level as compared to the concentration of industry or time period j. When F*<1, the tabular F is $1/F(\alpha, n_j\text{-}1, n_i\text{-}1)$.

A further form of analysis is to determine whether the trends in concentration indexes are significant over the period 1995-2006. A simple way to do this is to apply the suggestion by Lapin (1993) that time series covering a small number of years may be fitted by a straight line of the form

$H_t = a + bt$ (9)

where H_t is the computed value of the H index and t is a code for time serving as the independent variable. Thus, for 1995-2006, t=1,2,…,12. The slope "b" measures the annual increase or decrease in the time series and "a" is the intercept. The test statistic for significance of b is

$t = b/S_b$ (10)

where S_b is the standard error of the slope b.

Equation (9) is applied to H for various industries based on sales. In each case, the hypothesis of equality of trends will be tested in accordance with the suggestion of Bailey (1985) by the test statistic

$$t = (b_1 - b_2)/[S_{b1}^2 + S_{b2}^2]^{1/2}$$ (11)

where b_1 and b_2 are the slope coefficients for the two industries, and s^2_{b1} and s^2_{b2} are their squared standard errors.

FINDINGS

Table 1 shows the average revenues ($million) of the seven industries listed in reversed chronological order from 2006 to 1995. For the general merchandisers (G_1), the mean ranged from approximately $11.4 billion in 1995, rising substantially to approximately $36 billion in 2006, an increase of 322 percent. A comparable pronounced increase was for food and drug store (G_3) at 323 percent. The increases in means for the remaining five industries ranged from 151 percent to 218 percent.

Table 2 provides the means of profits as percent of revenue as well as the minimum and maximum, in parentheses, for the seven industries arranged by year in

a similar manner as Table 1. The average return for general merchandisers (G_1) in 2006 was 3.6 percent with a minimum of a loss at -3 percent and a maximum of 7 percent. For 1995, the corresponding numbers were 2.2, -12 and 6. With one exception, G_2 in 2003, the average returns were positive. In almost all instances in

TABLE 1
MEANS OF REVENUES ($MILLIONS)
OF SEVEN INDUSTRIES

	G1	G2	G3	G4	G5	G6	G7
2006	36,839	4,012	16,412	8,656	9,306	12,850	7,286
2005	29,621	4,113	14,564	8,190	8,688	11,781	6,661
2004	30,236	3,755	14,122	7,347	8,083	11,673	6,070
2003	29,464	3,356	13,485	7,194	8,587	12,066	7,022
2002	26,288	3,691	13,229	6,308	7,927	15,364	5,522
2001	26,067	3,416	12,025	6,225	8,571	17,459	5,183
2000	21,379	3,383	10,006	5,934	8,218	13,954	4,876
1999	17,510	2,751	8,089	6,496	7,916	12,392	5,141
1998	14,096	3,004	6,177	6,530	7,762	9,878	4,571
1997	13,322	2,728	5,634	6,180	7,610	9,085	4,161
1996	12,431	2,813	5,261	6,329	7,217	8,286	3,647
1995	11,436	2,656	5,085	5,368	5,951	7,266	3,341

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drug Stores, G4-Food Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals, G7-Specialty Retailers.
Source: Fortune 1000 Companies, Fortune (1995-2006).

Table 2, the minimum was negative, implying losses experienced by some companies in each group. Not surprisingly, the highest returns were for G_6 (pharmaceuticals) with returns of approximately 15 percent. Households and personal products (G_5) performed relatively well at returns ranging between 4.9 percent in 2002 and 8.8 percent in 2005.

TABLE 2
MEAN, MINIMUM AND MAXIMUM OF PROFIT AS A
PERCENT OF REVENUE FOR SEVEN INDUSTRIES

	G1		G2		G3		G4		G5		G6		G7	
2006	3.6	(-3, 7)	5.4	(-2, 11)	0.6	(-8, 5)	6.6	(1,13)	8.7	(0,24)	15.7	(4,40)	3.6	(28,23)
2005	3.5	(-1, 6)	5.5	(1, 10)	1.5	(-3, 4)	6.6	(-1,14)	8.8	(-2,16)	12.6	(-12,34)	4.4	(-1,20)
2004	2.4	(-8, 8)	18.4	(-9,159)	1.6	(-1, 4)	5.7	(-2,15)	7.9	(-12,15)	13.1	(-3,30)	3.6	(-2,12)
2003	1.6	(-11, 7)	-3.3	(-84, 8)	0.9	(-5, 4)	5.8	(-1,15)	8.4	(1,14)	13.5	(-25,30)	5.9	(-13,21)
2002	0.5	(-22, 7)	4.2	(1, 9)	0.1	(10, 4)	4.9	(0,15)	4.9	(-12,12)	16.3	(-9,28)	2.3	(-18,12)
2001	1.5	(-6, 6)	3.4	(-6, 7)	0.3	(-14, 7)	6.6	(-1,19)	5.9	(-9,13)	15.7	(17,31)	1.0	(-51,13)
2000	3.4	(-1, 9)	4.0	(0, 7)	2.4	(-2, 13)	6.5	(-10,36)	6.1	(-20,13)	17.0	(-9,33)	2.0	(-44,10)
1999	2.4	(5, 6)	4.0	(-2, 10)	0.7	(15, 6)	5.3	(-3,20)	7.5	(-6,14)	16.7	(-7,32)	2.9	(-4,22)
1998	1.9	(-14,16)	7.7	(2, 23)	0.9	(-8, 9)	2.4	(-37,14)	8.2	(2,15)	13.6	(-5,27)	1.8	(-13, 8)
1997	2.1	(-14, 6)	6.3	(2, 9)	1.8	(-6,31)	2.4	(-29,12)	7.2	(1,13)	13.8	(-14,30)	1.7	(-13, 9)
1996	1.9	(-12, 6)	3.0	(-10, 11)	0.9	(-7, 6)	4.3	(-16,13)	5.9	(0,17)	15.1	(7,30)	0.5	(-24, 9)
1995	2.2	(-12, 6)	5.0	(3, 8)	1.0	(-5, 5)	3.9	(-9,14)	7.5	(1,17)	15.4	(8,20)	1.9	(-24, 9)

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drugstores, G4-Food Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals, G7-Specialty Retailers; Numbers in parentheses are the minimum and maximum. Source: Fortune 1000 Companies, Fortune (1995-2006).

Table 3 provides the first measure of concentration, the 4-firm concentration ratio CR4. For the general merchandisers (G_1), in 1995 the top four companies captured 70 percent of total revenues in the sample. By 2006, the ratio was about 85 percent. With the exception of the apparel group (G_2), which showed a decline in ratio from 83 percent to 63 percent, and food and drugstore (G_3), which showed a relatively large increase from 39 percent to 61 percent, the remaining three groups showed minor changes. The findings here give a first glimpse of the extent of concentration in the general merchandisers group, which, as shown later, could be

attributed to the increase in Wal-Mart's share of revenues among this group over the years.

TABLE 3
SHARES OF TOP 4 COMPANIES (CR4)
OF SEVEN INDUSTRIES

	G1	G2	G3	G4	G5	G6	G7
2006	0.8546	0.6266	0.6146	0.5074	0.7621	0.5989	0.4266
2005	0.7941	0.6099	0.6137	0.4767	0.7224	0.6158	0.4153
2004	0.7873	0.5936	0.6187	0.5296	0.7316	0.6233	0.4218
2003	0.7734	0.5848	0.6128	0.5546	0.7575	0.6172	0.3287
2002	0.7556	0.6324	0.6171	0.5568	0.7494	0.6262	0.3996
2001	0.7389	0.6438	0.6081	0.5256	0.6299	0.6270	0.3735
2000	0.7211	0.6693	0.5896	0.4583	0.6254	0.5770	0.3557
1999	0.7001	0.5814	0.4211	0.4905	0.6312	0.5618	0.3446
1998	0.6888	0.6811	0.4193	0.4915	0.6241	0.5579	0.3275
1997	0.6864	0.7143	0.4028	0.4950	0.6217	0.5551	0.3151
1996	0.6837	0.8256	0.3982	0.4986	0.6280	0.5402	0.3331
1995	0.7053	0.8338	0.3868	0.4680	0.6976	0.5488	0.3332

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drugstores, G4-Food
Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals,
G7-Specialty Retailers.
Source: Fortune 1000 Companies, Fortune (1995-2006).

Table 4 provides the coefficient of variation (CV), calculated using equation (3). The picture here is a mirror image of the findings in Table 3, showing that the most prominent increase in concentration was for the general merchandisers, where CV increased from 1.75 in 1995 to 2.22 in 2006. For G_2, the increase between the two periods is hardly noticeable. For G_7, the specialty retailers, the increase was also notable, from 1.03 to 1.76.

TABLE 4
COEFFICIENTS OF VARIATION OF
SEVEN INDUSTRIES

	G1	G2	G3	G4	G5	G6	G7
2006	2.22	0.87	1.14	0.89	1.60	1.20	1.76
2005	2.29	0.75	1.17	0.87	1.50	1.29	1.73
2004	2.07	0.71	1.13	0.98	1.40	1.19	1.71
2003	2.02	0.73	1.12	1.06	1.30	1.22	2.05
2002	1.97	0.66	1.13	1.04	1.34	0.93	1.59
2001	1.79	0.69	1.17	1.01	1.31	0.68	1.49
2000	1.81	0.81	1.26	0.96	1.30	0.66	1.37
1999	1.79	0.85	0.99	0.94	1.32	0.62	1.12
1998	1.83	0.83	1.11	0.95	1.30	0.76	1.08
1997	1.76	0.71	1.05	1.01	1.31	0.74	1.03
1996	1.69	0.79	1.04	0.98	1.32	0.70	1.06
1995	1.75	0.78	1.05	1.01	1.42	0.68	1.03

Note: G1-General Merchandisers, G2-Apparel, G3-Food and
Drugstores, G4-Food Consumer Products, G5-Household and
Personal Products, G6-Pharmaceuticals, G7-Specialty Retailers.
Source: Fortune 1000 Companies, Fortune (1995-2006).

The calculated Herfindahl indexes (H) using equation (1) and its related numbers equivalent m=1/H using equation (2) are presented in Tables 5 and 6, which show for general merchandisers an increase in H from H=0.1639 in 1995 to H=0.3992 in 2006 (Table 5), corresponding to a decrease in m for the corresponding periods from m=6.10 to m=2.50 (Table 6).

TABLE 5
HERFINDAHLS FOR GROUPS OF INDUSTRIES

	G1	G2	G3	G4	G5	G6	G7
2006	0.3992	0.1413	0.1242	0.0974	0.2582	0.1249	0.0612
2005	0.3500	0.1375	0.1211	0.0859	0.2200	0.1293	0.0597
2004	0.3137	0.1323	0.1228	0.0956	0.2163	0.1304	0.0617
2003	0.3026	0.1245	0.1214	0.1034	0.2305	0.1267	0.0827
2002	0.2740	0.1393	0.1223	0.1126	0.2207	0.1290	0.0610
2001	0.2510	0.1434	0.1210	0.1034	0.2317	0.1287	0.0556
2000	0.2278	0.1594	0.1147	0.0821	0.2296	0.1167	0.0524
1999	0.2018	0.1281	0.0747	0.0840	0.2340	0.1130	0.0507
1998	0.1831	0.1625	0.0683	0.0848	0.2299	0.1093	0.0474
1997	0.1798	0.1612	0.0626	0.0858	0.2338	0.1075	0.0462
1996	0.1699	0.2187	0.0604	0.0912	0.2340	0.1038	0.0464
1995	0.1639	0.2164	0.0593	0.0897	0.2580	0.1096	0.0462

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drugstores, G4-Food
Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals, G7-Specialty
Retailers; Calculations by Equation (1).
Source: Fortune 1000 Companies, Fortune (1995-2006).

TABLE 6
NUMBERS EQUIVALENT FOR GROUPS OF INDUSTRIES

	G1	G2	G3	G4	G5	G6	G7
2006	2.51	7.08	8.05	10.27	3.87	8.01	16.34
2005	2.86	7.27	8.26	11.64	4.55	7.73	16.76
2004	3.19	7.56	8.14	10.46	4.62	7.67	16.20
2003	3.30	8.04	8.24	9.67	4.34	7.89	12.10
2002	3.65	7.18	8.18	8.88	4.53	7.75	16.39
2001	3.98	6.97	8.27	9.67	4.32	7.77	17.98
2000	4.39	6.27	8.72	12.18	4.36	8.57	19.08
1999	4.95	7.80	13.39	11.91	4.27	8.85	19.74
1998	5.46	6.15	14.63	11.80	4.35	9.15	21.10
1997	5.56	6.20	15.96	11.66	4.28	9.30	21.64
1996	5.88	4.57	16.55	10.97	4.27	9.63	21.54
1995	6.10	4.62	16.85	11.15	3.88	9.13	21.66

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drugstores, G4-Food
Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals,
G7-Specialty Retailers; Calculations by Equation (2).
Source: Fortune 1000 Companies, Fortune (1995-2006).

To statistically verify whether the rate of change in concentration between 1995 and
2006 for the H index is significantly positive (increase in concentration) or negative
(decrease in concentration), time series equations 9 and 10 were used. The results are
shown in Table 7.

TABLE 7
TIME TRENDS OF HERFINDAHL
FOR SEVENINDUSTRIES

Group	B	t-value	p-value
G1	0.0209*	14.24	0.000
G2	-0.0068*	-3.83	0.003
G3	0.0073*	6.75	0.000
G4	0.0011	1.39	0.194
G5	-0.0010	-0.89	0.394
G6	0.0025*	6.00	0.000
G7	0.0021*	3.34	0.008

Note: G1-General Merchandisers, G2-apparel, G3-Food and Drugstores,
G4-Food Consumer Products,G5-Household and Personal Products,
G6-Pharmaceuticals,G7-Specialty Retailers;
*-Significance at 0.05 level; Calculations by Equations (7) and (8).
Source: Fortune 1000 Companies, Fortune (1995-2006).

Table 7 reveals that only G_1, G_3, G_6 and G_7 showed statistically significant increases in concentration trends. On the other hand, the time trend (equation 9) in concentration for G_4 and G_5 was not significantly different from zero, based on the p-values of test statistic from equation (10). Also for G_5, the trend b=-0.0010 indicates, in fact, a decrease in concentration. Another group which showed a significant decrease is G_2 (apparel) at b=-0.0068.

Since the interest of this research is primarily in the concentration of the general merchandisers and how it compares to other consumer or retail industries, the model of equation (11) was utilized. The test hypothesis was

$$H_o : \beta_1 = \beta_2$$
$$H_a : \beta_1 \neq \beta_2$$

where

β_1=slope of H for general merchandisers (G_1) and
β_2=slope of H for the other groups denoted by β_2.

The results, shown in Table 8, confirm that the trend in concentration for the general merchandisers (G_1) is significantly greater than for the other six groups. All p-values of the tests are zero.

TABLE 8
TESTING FOR EQUALITY OF TRENDS OF HERFINDAHLS
FOR GENERAL MERCHANDISERS AND OTHER GROUPS

	b1	b2	Sb1	Sb2	t-value	p-value
G1 vs. G2	0.0209	-0.0068	0.0015	0.0018	11.82	0.000
G1 vs. G3	0.0209	0.0073	0.0015	0.0011	7.31	0.000
G1 vs. G4	0.0209	0.0011	0.0015	0.0008	11.65	0.000
G1 vs. G5	0.0209	-0.0010	0.0015	0.0011	11.77	0.000
G1 vs. G6	0.0209	0.0025	0.0015	0.0004	11.85	0.000
G1 vs. G7	0.0209	0.0021	0.0015	0.0006	11.64	0.000

Note: G1-General Merchandisers, G2-Apparel, G3-Food and Drugstores, G4-Food Consumer Products, G5-Household and Personal Products, G6-Pharmaceuticals, G7-Specialty Retailers; Calculations by Equation (9).
Source: Fortune 1000 Companies, Fortune (1995-2006).

While the test for equality of slopes of H made above compared concentration between general merchandisers and the other six industries, it remains to be seen if on average the levels of concentration based on the 12 years for H shown in Table 5 for the seven industries are equal. In other words, based on 120 observations for each of G_1, G_2,…, G7, the hypothesis to be tested was

$$H_o : \mu_1 = \mu_2 = \ldots = \mu_7$$
$$H_a : \text{at least one } \mu_i \text{ differs}$$

where

μ_i=mean of H for group G_i, i=1,2,…,7.

Analysis of variance was the appropriate test for this hypothesis. The means for H of the seven groups lined up from highest to lowest are

	Mean
G_1	0.2514
G_5	0.2331
G_2	0.1554
G_6	0.1190
G_3	0.0977
G_4	0.0930
G_7	0.0559

Based on these averages, analysis of variance was employed to accept or reject the hypothesis of equality. With a test statistic F=55.21 (p-value=0.00), the hypothesis of equality was rejected. The F-test, however, does not tell which means differ from each other, according to Miller (1986). To overcome this deficiency, multiple comparisons methods were developed whereby pairs of means are tested for equality. The Tukey-Kramer method is one of these, especially useful when the sample sizes are not equal, as is the case in this study. On employing the Tukey-Kramer simultaneous comparison pairwise t-tests for all the combinations of G_1, G_2,…,G_7, the results indicate no statistical significance between G_1 (general merchandisers) and G_5 (household and personal products), and these two groups are significantly different from the rest.

Two final tests were conducted, this time with each group looked at separately, employing the tests suggested by equation (6). The results are shown in Tables 9 and 10. In Table 9, the variance of H for 2006 is divided by the variances of the preceding years, denoted by F*. These ratios are compared with tabular F, which depends on the degrees of freedom of the observations. An asterisk indicates significance at the 5 percent level. Note here that when F*<1.00, the indication is that the variance of H in 2006 was smaller than for the year under consideration. The result shows that for G_1 (general merchandisers), the concentration in 2006 was statistically significant when compared to 2000 and former years.

A further look at Wal-Mart's share of the general merchandisers market along the years as compared with the second largest in the group (Target) is given below.

Year	Walmart Share	Target Share
2006	0.612	0.102
2005	0.572	0.099
2004	0.535	0.010
2003	0.523	0.093
2002	0.492	0.092
2001	0.463	0.098
2000	0.433	0.107
1999	0.396	0.118
1998	0.368	0.127
1997	0.362	0.130
1996	0.342	0.129
1995	0.304	0.199

The above data indicate that, beginning in 2001, Wal-Mart's market share approached 50 percent, and eventually became 61 percent by 2006. Therefore, the significantly increasing concentration in G_1 that began in 2001 and continued to 2006 can be attributed to the increasing Market share of Wal-Mart. Note, by the way, that the market share of Target, the second largest company in the general merchandisers group declined from approximately 0.20 in 1995 to 0.10 in 2006.

Table 10 is constructed in a manner similar to Table 9 by using the F-test of equation (6), comparing for each group the ratio of variances of two consecutive years. In each case, the test accepts the null hypothesis of equality of variances because the ratios of the test F* are smaller than the tabular F, which depends on the degrees of freedom. Again, when F*<1.00, it means that the variance of the given year (i) is smaller than the variance of year (i-1), the preceding year. The result shows that the changes in concentration for consecutive years for the seven groups under consideration were not statistically significant.

SUMMARY AND CONCLUSIONS

Two questions arise as to whether (1) the degree of concentration in the general merchandisers industry because of Wal-Mart far exceeds many other industries, and whether (2) Wal-Mart's increased market share had beneficial impact to the consumers. A partial answer to the first question is provided in this paper. The conclusion, based on the computations so far, indicates that concentration in the general merchandisers industry is statistically significant in contrast to other industries.

The answer to the second question is perhaps that Wal-Mart's increased market share may be categorized as industry rationalization rather than industry concentration. According to Notebaert (2005) concentration and rationalization, though they are a matter of degree, differ considerably in their aims. Concentration promotes size and geographic dominance for their own sakes. Concentration contributes, as a result of combining different corporate structures in the process of takeovers, to inflation of bureaucracy, to reduction in price competition, to the limitation of innovation and to hindering effective regulation. Rationalization, as also pointed out by Troutman (2005), the consolidation of an industry, is done to achieve economies of scale, to expand market penetration in different geographic areas and to show shareholders improvements in revenue/earnings growth. Also, rationalization should induce technological innovations and lower prices.

Norris (2006) summarizes adequately the Wal-Mart phenomenon by stating (Page 4) that "Wal-Mart is under attack for paying too little, providing benefits that are too small and even exploiting illegal immigrants. Laws have been written with Wal-Mart in mind, and more are being proposed." Norris goes on to express that Wal-Mart's success is due to its ability to sell at low prices, which is argued to reduce inflation and make the economy more efficient. Norris also remarks that big businesses in the past, such as railroads and Rockefeller's Standard Oil, have been reviled and were at the same time popular, which led to reforms and regulations. What remains to be seen is whether Wal-Mart's market power deserves the concern of the regulators in the United States, as is the case with Tesco in Britain.

Lynn (2006) clearly believes it does, presenting Wal-Mart not only as a practitioner of monopoly power, but also as a practitioner of monopsony power. Lynn buttresses this view with illustrations of monopsony power practiced by Wal-

Mart against Coca-Cola and Kraft and even Proctor and Gamble. Wal-Mart did not approve of an artificial sweetener planned for use by Coca-Cola. Kraft shut down 39 plants and eliminated a quarter of its products, resulting in 13,500 lost jobs because of pressure from Wal-Mart to reduce prices.

Lynn explains that antitrust cases should be brought against Wal-Mart to break it into pieces as was done against Standard Oil and the grocer A&P half a century ago. A&P operated some 4,000 supermarkets in about forty states, wielding powerful influence over the food economy. Similar to Wal-Mart, A&P was known for innovations in advertising, distribution and retailing, practicing at the same time monopsony power. According to Lynn, the Robinson Patman law of 1956, commonly known as the "Anti-A&P Act," and the Sherman Act were used by the Federal Trade Commission and the Justice Department in many cases against A&P, finally breaking it apart in 1979. It is ironic, according to Lynn, that Wal-Mart CEO Lee Scott called on the British government to bring action against Tesco because it has a 30 percent share of grocery sales in Britain. Accordingly, Lynn believes that such action by Wal-Mart, which controls more than 30 percent of many markets with plans to double its sales, is an example of self confidence which could result in retribution.

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