AN EMPIRICAL INVESTIGATION OF THE RELATIONSHIP BETWEEN COUPONS AND MARKET SHARES OF NATIONAL BRAND AND PRIVATE LABEL FOOD PRODUCTS

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Abstract

No other form of promotional tools can substitute coupons in promotional campaigns. Due to their unique dual impact (price discount and informational stimulant) on consumption, coupons are widely used by different manufacturers and stores. However, to the best of our knowledge, no prior research has been done regarding the analysis of the impact of coupons on market shares of national brand and private label food products. To fill this void, the goal of this study was to examine the relationship between coupons and market shares in the context of national brand and private label food products by estimating the Almost Ideal Demand System model and using the Nielsen Homescan panel data on household purchases of ready-to-eat cereal, yogurt, and spaghetti sauce from January of 2012 through December of 2014.

Estimation results revealed a significant relationship between coupon values and market shares of the food product brands considered. However, the effects of coupon values on the market shares were varied for national brands and private labels. In particular, with the exception of other brands of yogurt, for national brands, market share elasticities with respect to coupon values were positive, suggesting that market share of national brands increased with an increase in coupon values. For private label of cereal and spaghetti sauce, market share elasticities with respect to coupon values were negative, indicating that an increase in coupon values led to a decline in their market shares.

Key words: coupons, market shares, brands, demand system

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Introduction

Coupons are one of the most important marketing tools used by different companies to promote their products (Goodwin, 1992). They are the most popular promotional tools after shelf price reductions (Sethuraman & Mittelstaedt, 1992). The number of coupons used is increasing year by year. According to Nevo and Wolfram (2002), one of the biggest parts of the promotional budget is the cost of couponing. In 1996, the annual distribution of coupons for consumer packaged goods was 268.5 billion coupons, and only 5.3 billion (or about 2%) of these coupons were redeemed (Nevo & Wolfram, 2002). The average value of coupons used in 1996 was $0.69 which means that the value of all redeemed coupons was $3.5 billion (Nevo & Wolfram, 2002).

According to the Inmar Inc. (2014), the annual distribution of coupons for consumer packaged goods increased by 3.6% from 2012 to 2013 and reached the annual value of 329 billion. The total value of coupons was $513 million which means that each person in the United States had an opportunity to save $1,617 using coupons. However, from the total distributed coupons only $3.7 billion were redeemed ($11.6 saving per customer) (Inmar Inc., 2014).

Using coupons as a promotional tool for food products is very effective. In 2013, 129.8 billion coupons were distributed for food products (by 1.2% more than in 2012), and 1.9 billion coupons were redeemed. According to the Inmar Coupon Trends report, while only 40% of coupons distributed in 2013 was for food products, the share of food products in the number of redeemed coupons was more than 66% (Inmar Inc., 2014).

There are two major coupon categories, manufacturer coupons and store coupons, which are distributed to customers as mobile coupons, paper coupons, online coupons and ecoupons. Manufacturer coupons are issued by producers and customers can use these coupons in any store

they want. Unlike manufacturer coupons, store coupons are issued by certain stores and can be redeemed only in those stores. Thus, while manufacturer coupons are promotional tools for producers, store coupons are promotional tools for both producers and stores (Montaldo, 2016).

When coupons are issued, they have several effects on the consumption behavior (Sethuraman & Mittelstaedt, 1992). The first effect is the regular usage effect. Customers will use coupons when their perceived value obtained from redeeming a coupon is higher than the perceived effort of getting and redeeming it. Buyers who are already customers of one particular brand, and who already like it, will use coupons to get their favorite brand at reduced price if coupons are available. The second effect is acceleration effect, according to which regular customers will redeem a coupon and purchase more than they would normally buy in periods when coupons are not available. This will accelerate the sale of the product during the time when the coupon is offered, however, sales will decrease in the subsequent periods. The third effect of issuing coupons is the brand switching effect. Some customers that used to buy other brands will use the benefit of coupons and buy the couponed brand. Usually, in this case, coupons attract those customers who are very price sensitive and the perceived cost of getting and redeeming the coupons is not high. In this case, the market share of the brand will increase at the expense of competing brands. Gupta (1988) conducted a more comprehensive research on how coupons can impact brand switching and found out that about 84% of increase in sales is a result of promotional activities stemming from brand switching.

The next effect of issuing coupons is the store switching (within brand) effect. In this case, customers will get coupons and shop in those stores where retailers offer special promotions and those coupons can be redeemed. However, this effect is present only in case of store coupons and in case of manufacturer coupons this effect is zero. The fifth effect is brand

and store switching effect when customers change both brand and store to use the coupon. This will strongly increase the sale of the couponed brand in the couponed store and decrease the market share of competing brands in other stores. Finally, the last effect of issuing coupons is the primary demand effect. This means that offering coupons may increase the demand for the couponed brand. Non-customers will start to buy the brand and the current customers will start to buy more than their normal quantities (Sethuraman & Mittelstaedt, 1992).

As such, it is important to understand how coupons impact the demand for food products. This study is focused on the analysis of the effects of coupons on food products at the brand level for different food groups (ready-to-eat cereal, yogurt, and spaghetti sauce). According to the Nielsen Homescan panel data for the calendar year of 2014, breakfast cereal, yogurt, and spaghetti sauce were amongst the top couponed food products. Overall, five groups of brands for each food product category were chosen for this analysis. From different brands, three most couponed brands were chosen for each food product. Besides these three brands for breakfast cereal, yogurt, and spaghetti sauce, the analysis also included private labels and other brands. All private labels were grouped under the label of "private label", and all other brands were grouped under the label of "other brands" for each of the three food products.

According to the Nielsen Homescan panel data for the calendar year of 2014, the most couponed breakfast cereal brands in 2014 were General Mills, Kellogg's, and Post. Per the Nielsen Homescan panel data for the calendar year of 2014, the most couponed yogurt brands in 2014 were Yoplait, Dannon, and Chobani. Based on the Nielsen Homescan panel data for the calendar year of 2014, the most couponed spaghetti sauce brands in 2014 were Ragu, Hunt's, and Classico.

Prior to this analysis, several studies have tried to assess the impact of coupons on the demand for food products. However, the present study differs from previous research in a few aspects. First, the present study was done at the brand level by explicitly considering top couponed brands within each select food product category. Second, unlike previous studies, the present analysis used a formal demand system approach to analyze the effects of coupons on market shares of brands for several highly couponed food products by conveniently taking advantage of the fact that the dependent variable of the demand system utilized is virtually brand-specific market shares utilizing a household-level data. Third, this study allows for the comparison of the impact of coupons on the market shares for national brands versus that of private labels. As such, the present study is a comprehensive analysis of the effects of coupons on the market share of national brands and private label food products, which, to the best of our knowledge, represents a solid contribution to the current literature on coupons and their effects on brand competition.

The primary objective of this study is to analyze the impact of coupons on the market shares of brands of food products such as breakfast cereal, yogurt, and spaghetti sauce using a demand system approach. More specifically the objectives are:

1. To estimate demand equations for each brand of considered food products using the Almost Ideal Demand System (AIDS) model to evaluate the relationship between coupons and the market shares of brands of the food products.
2. To estimate compensated and uncompensated price and expenditure elasticities for each brand of the food products.
3. To estimate market share elasticities with respect to coupon values for each brand of the food products.

This study is significant in that it assists in:

1. Understanding the brand competition in the food products industry in the context of coupons;
2. Understanding the consumption behavior with respect to the national and private label brands of the food products in the context of coupons;
3. Better understanding the impact of coupons on the consumption of breakfast cereal, yogurt, and spaghetti sauce for the sake of improving companies' marketing mix;
4. Shedding light on the difference in the responses of market shares of national brands versus that of private labels as a result of coupons for companies to better structure their marketing mix;
5. Designing corresponding pricing strategies for breakfast cereal, yogurt, and spaghetti sauce brand manufacturers in order to maximize their total revenue.

This study proceeds in the following manner. The model is presented and discussed in the next section. Then, the data used in this analysis are presented followed by the estimation procedure and the results. Summary and conclusions comprise the final section.

Model

In this study, the Almost Ideal Demand System model augmented by including the variable accounting for the coupon value was used. The original model was introduced by Deaton and Muellbauer (1980) and became one of the popular models in the demand analysis. The augmented looks as follows:

$$w_{it} = \alpha_i + \sum_j \gamma_{ij} \log p_{jt} + \beta_i \log(X_t/P_t) + \lambda_i Coupon_{it} + \varepsilon_{it}, i = 1, \dots n, \qquad (1)$$

where at observation t, w_{it} is the market share (budget share) of the i^{th} brand, p_{jt} is the price of the j^{th} brand, X_t is the total expenditure on the system of brands, $Coupon_{it}$ is the coupon value for

brand i, α_i, γ_{ij}, β_i, and λ_i are the parameters to be estimated, ε_{it} is the disturbance term, and P_t is the translog price index given by:

$$log\, P_t = \alpha_0 + \sum_k a_k\, log\, p_{kt} + \frac{1}{2}\sum_j \sum_k \gamma_{kj}\, log\, p_{kt}\, log\, p_{jt} \quad (2)$$

The following theoretical restrictions were imposed on the parameters of the model:

adding-up: $\sum_{i=1}^{n} \alpha_i = 1 \quad \sum_{i=1}^{n} \gamma_{ij} = 0 \quad \sum_{i=1}^{n} \beta_i = 0 \quad \sum_{i=1}^{n} \lambda_i = 0$ (3)

homogeneity: $\sum_j \gamma_{ij} = 0$ (4)

symmetry: $\gamma_{ij} = \gamma_{ji}$ (5)

Based on the parameter estimates price, expenditure, and market share elasticities with respect to coupon values were computed. Uncompensated own-price and cross-price elasticities for the AIDS model were proposed by Green and Alston (1990) and are computed as follows:

$$e_{ij}^{u} = -\,\delta_{ij} + \gamma_{ij}/w_i - \beta_i w_j/w_i, \quad (6)$$

where δ_{ij} is the Kronecker delta and $\delta_{ij} = 1$ if i = j; $\delta_{ij} = 0$ if $i \neq j$, w_i and w_j represent the budget shares of brands i and j, respectively. The following Slutsky equation was used to calculate compensated own-price and cross-price elasticities:

$$e_{ij}^{c} = e_{ij}^{u} + e_i w_j \quad (7)$$

where e_i is expenditure elasticity calculated using the following formula proposed by Green and Alston (1990):

$$e_i = 1 + \beta_i/w_i \quad (8)$$

Market share elasticities with respect to coupon values (e_c) were computed the following:

$$e_c = \lambda_i/w_i \quad (9)$$

Due to the law of demand, own-price elasticities were anticipated to have a negative sign. Considering the fact that within the same food product category brands are substitutes for each

other, a positive sign was anticipated on cross-price elasticities. Expenditure elasticities were expected to have a positive sign, since the brands of cereal, yogurt, and spaghetti sauce are considered to be normal goods. Finally, the sign of market share elasticities with respect to coupon values was anticipated to be positive.

Data

For our analysis, weekly time series data derived from the Nielsen Homescan panels from January 1 of 2012 through December 27 of 2014 were used. Nielsen Homescan panel data include 60,000 U.S. households who use special in-home scanners to record their purchases and provide that information to Nielsen. They also provide information about their household socio-economic characteristics such as age, education, income, number of children, etc.

The dataset used in the analysis extended for 156 weeks and included information on weekly totals of quantities, prices (unit values), and coupon values of ready-to-eat cereal, yogurt, and spaghetti sauce brands: General Mills, Kellogg's, Post, private label, and other brands for cereal; Yoplait, Dannon, Chobani, private label, and other brands for yogurt; and Ragu, Hunt’s, Classico, private label, and other brands for spaghetti sauce.

The weekly totals of quantity purchased for each brand was developed by aggregating total purchases (in ounces) of the brand during the week and dividing it by the number of unique households that purchased the brand during that week. Since the raw data included just the total amounts that were paid, the weekly unit values for each brand (in place of prices) were developed by dividing total expenditures by total ounces. Then, unit values were adjusted for inflation using Consumer Price Index (CPI) with the average CPI of 1982 to 1984 as a base period (United States Bureau of Labor Statistics, 2016). The descriptive statistics of the variables used in the analysis is available upon request.

Estimation Procedure and Results

In this study, the AIDS model was estimated for cereal, yogurt, and spaghetti sauce brands with parametric restrictions imposed. SAS 9.3 statistical software package was used in the estimation with the Iterated Seemingly Unrelated Regression (ITSUR) procedure applied. As the error terms in our model were assumed to follow a multivariate normal distribution, the ITSUR estimators are equivalent to the maximum likelihood estimators (Judge, Hill, Griffiths, Luekepoh, & Lee, 1988). Since the sum of budget shares equals unity, it causes the issue of singularity of variance-covariance matrix of disturbance terms. To solve this issue, the equation of private label was left out for all three food products and later the parameters of these omitted equations were recovered through the restrictions of adding-up, symmetry, and homogeneity. The R^2s for the private label equations were calculated by squaring the correlation coefficient between the predicted and actual values of the regressand. The Durbin-Watson statistics for private label was computed by dividing the sum of squared differences in successive residuals by the sum of squares of residuals (Durbin & Watson, 1951).

The issue present during the estimation of the system of equations was the endogeneity of total expenditure due to its correlation with the disturbance term. According to Summers (1959), Lluch & Williams (1974), and Deaton (1980), this issue stems from the simultaneous equation nature of problem. The method proposed by Attfield (1983) was used to address this issue.

In 1962, Zellner took into consideration the impact of contemporaneously correlated disturbance terms for the estimation of system of equations. Berndt and Savin (1975) proposed first-order autoregressive correction procedure [AR(1)] to solve the issue of serial correlation. One coefficient of AR(1), rho, was estimated for the entire system of equations (Berndt & Savin, 1975). Statistical tests were evaluated at the 5% significance level.

Table 1 presents the parameter estimates and p-values from the estimated AIDS model for cereal, yogurt, and spaghetti sauce (the estimates of compensated and uncompensated price and expenditure elasticities are available from authors upon request).

Table 1. Coefficients from the AIDS model

Parameter	Cereal		Yogurt		Spaghetti Sauce	
	Estimate	p Value	Estimate	p Value	Estimate	p Value
g_{11}	0.1094*	0.0001	0.0471*	0.0216	0.0343	0.1636
g_{12}	-0.0147	0.1218	0.0130	0.4688	0.0292	0.1170
g_{13}	-0.0471*	0.0001	-0.0685*	0.0013	0.0302	0.1625
g_{14}	-0.0091	0.4560	0.0123	0.4189	-0.0787*	0.0001
g_{15}	-0.0386*	0.0001	-0.0039	0.7128	-0.0150	0.2263
g_{22}	0.0596*	0.0001	0.0668*	0.0257	-0.0140	0.5606
g_{23}	-0.0169	0.0802	0.0493	0.1840	-0.0208	0.1651
g_{24}	0.0174	0.1278	-0.1047*	0.0001	0.0425*	0.0146
g_{25}	-0.0454*	0.0001	-0.0244	0.0637	-0.0369*	0.0033
g_{33}	0.0794*	0.0001	-0.0652	0.3253	0.0135	0.6227
g_{34}	-0.0112	0.3715	0.0587	0.0532	0.0115	0.6224
g_{35}	-0.0043	0.6069	0.0257	0.2029	-0.0344*	0.0002
g_{44}	0.0149	0.4371	0.0769*	0.0002	0.0171	0.4459
g_{45}	-0.0120	0.2451	-0.0432*	0.0001	0.0076	0.5893
g_{55}	0.1002*	0.0001	0.0459*	0.0002	0.0786*	0.0001
a_1	0.4402*	0.0001	-0.0894	0.3839	0.6588*	0.0001
a_2	0.2174*	0.0425	0.7318*	0.0001	-0.2754*	0.0105
a_3	0.1456	0.2604	-0.6011*	0.0007	-0.1761	0.3344
a_4	-0.0590	0.5797	0.5172*	0.0001	0.8522*	0.0001
a_5	0.2559*	0.0087	0.4414*	0.0001	-0.0596	0.5654
c_0	2.5220*	0.0001	2.0269*	0.0001	2.5186*	0.0001
c_1	0.1230*	0.0018	0.0839	0.0775	0.1763*	0.0002
c_2	0.0816*	0.0365	0.0368	0.3592	0.0401	0.5809
c_3	0.0809*	0.0268	-0.0362	0.4132	0.1125*	0.0001
c_4	0.0724	0.1202	0.0873*	0.0223	0.1012*	0.0239
c_5	0.1031*	0.0076	0.0036	0.9218	0.0648	0.1221
c_6	0.0986*	0.0001	0.0864*	0.0001	0.1209*	0.0001
rho	0.4839*	0.0001	0.5660*	0.0001	0.2879*	0.0001
rho_2	0.4937*	0.0001	0.6903*	0.0001	0.5640*	0.0001
b_1	-0.0531*	0.0055	0.0573*	0.0040	-0.0799*	0.0029
b_2	-0.0011	0.9605	-0.0966*	0.0001	0.0759*	0.0001
b_3	0.0127	0.6338	0.1592*	0.0001	0.0827*	0.0131
b_4	0.0568*	0.0105	-0.0690*	0.0020	-0.1167*	0.0001

$\mathbf{b_5}$	-0.0153	0.4361	-0.0509*	0.0001	0.0380*	0.0400
$\mathbf{z_1}$	0.0061*	0.0001	0.0029*	0.0020	0.0047*	0.0001
$\mathbf{z_2}$	0.0077*	0.0001	-0.0011	0.1758	0.0008	0.2732
$\mathbf{z_3}$	0.0018	0.0878	0.0005	0.4435	0.0046*	0.0001
$\mathbf{z_4}$	0.0009	0.4961	-0.0044*	0.0001	0.0024*	0.0246
$\mathbf{z_5}$	-0.0165*	0.0001	0.0021	0.1087	-0.0126*	0.0001

Note: The parameters g_{ij} show interactive effects between brands. For cereal, the subscript 1 is for General Mills, 2 for Kellogg's, 3 for Post, 4 for other brands and 5 for private label. For yogurt, the subscript 1 is for Yoplait, 2 for Dannon, 3 for Chobani, 4 for other brands and 5 for private label. For spaghetti sauce, the subscript 1 is for Ragu, 2 for Hunt's, 3 for Classico, 4 for other brands and 5 for private label. g_{12} for cereal shows the price effect of Kellogg's on the budget share of General Mills.
*The estimates of b_5 and g_{55} were recovered using adding-up restriction as $b_5 = 1 - (b_1 + b_2 + b_3 + b_4 +$ lambda) and $g_{55} = 0 - (g_{15} + g_{25} + g_{35} + g_{45})$
*rho, rho_2 are the autocorrelation coefficient on the error terms
z_i are parameter estimates associated with coupon values
*Asterisk indicates significance at the 0.05 level

Market share elasticities with respect to coupon values for all brands across all products are shown in Table 2. Out of 15 only 9 market share elasticities were statistically significant. Three of them were negative and the other six were positive. For cereal brands, the market share elasticity of General Mills with respect to coupon value was 0.0301, meaning that for every 1% increase in the redeemed coupon value of General Mills, its market share increased by 0.0301%, holding everything else constant. The market share elasticity of Kellogg's with respect to coupon value was 0.0357, meaning that for every 1% increase in the redeemed coupon value of Kellogg's, its market share increased by 0.0357%, holding everything else constant. The market share elasticity of private label of cereal with respect to coupon value was -0.0977, meaning that for every 1% increase in the redeemed coupon value of private label of cereal, its market share decreased by 0.0977%, holding everything else constant.

For yogurt brands, the market share elasticity of Yoplait with respect to coupon value was 0.0149, meaning that for every 1% increase in the redeemed coupon value of Yoplait, its market share increased by 0.0149%, holding everything else constant. The market share elasticity of other brands of yogurt with respect to coupon value was -0.0233, meaning that for

every 1% increase in the redeemed coupon value of other brands of yogurt, its market share decreased by 0.0233%, holding everything else constant.

For spaghetti sauce brands, the market share elasticity of Ragu with respect to coupon value was 0.0214, meaning that for every 1% increase in the redeemed coupon value of Ragu, its market share increased by 0.0214%, holding everything else constant. The market share elasticity of Classico with respect to coupon value was 0.0169, meaning that for every 1% increase in the redeemed coupon value of Classico, its market share increased by 0.0169%, holding everything else constant. The market share elasticity of other brands of spaghetti sauce with respect to coupon value was 0.011, meaning that for every 1% increase in the redeemed coupon value of other brands of spaghetti sauce, its market share increased by 0.011%, holding everything else constant. Finally, the market share elasticity of private label of spaghetti sauce with respect to coupon value was -0.0826, meaning that for every 1% increase in the redeemed coupon value of private label of spaghetti sauce, its market share decreased by 0.0826%, holding everything else constant.

Table 2. Market Share Elasticities with respect to Coupon Values for Cereal, Yogurt and Spaghetti Sauce

Cereal		Yogurt		Spaghetti Sauce	
General Mills	0.0301*	Yoplait	0.0149*	Ragu	0.0214*
	(0.0001)		(0.0020)		(0.0001)
Kellogg's	0.0357*	Dannon	-0.0049	Hunt's	0.0060
	(0.0001)		(0.1758)		(0.2732)
Post	0.0093	Chobani	0.0019	Classico	0.0169*
	(0.0878)		(0.4435)		(0.0001)
Other brands	0.0041	Other brands	-0.0233*	Other brands	0.0110*
	(0.4961)		(0.0001)		(0.0246)
Private label	-0.0977*	Private label	0.0148	Private label	-0.0826*
	(0.0001)		(0.1087)		(0.0001)

Note: All elasticities are calculated at the sample means.
*Asterisk indicates statistical significance at the 0.05 level.
*Numbers in parentheses are p-values

As expected, the signs of the market share elasticities with respect to coupon values of major national brands were positive. Given the relatively small promotion and marketing budget of other brands of yogurt coupled with the fact that the impact of coupons is not as strong for small brands as it is for the major national brands (Ailawadi, Lehmann, & Neslin, 2001), other brands of yogurt do not issue a lot of manufacturer coupons and the coupons redeemed on them were mostly store coupons redeemable on all types of brands. The possible explanation of the negative sign on the market share elasticity of other brands of yogurt is the fact that consumers redeemed most of these store coupons on major national brands.

Almost all coupons offered for private labels were store coupons which could be redeemed on both private label and national brands. The negative sign of market share elasticities of private labels of cereal and spaghetti sauce with respect to corresponding coupon values can be possibly explained by the fact that consumers redeemed store coupons mostly on national brands thus shifting from private label to national brands (Price & Connor, 2003).

The discussion above implies that coupons can different impacts on market shares of national brands and private labels of food products. While the amount of redeemed coupons can have positive impact on the market share of major national brands, their impact on the market share of private labels can be negative.

Summary and Conclusions

The number of distributed coupons for food products in 2013 was 129.8 billion and breakfast cereal, yogurt, and spaghetti sauce were among the most couponed food products from 2012 to 2014 (Inmar Inc., 2014). In this study, the AIDS model was estimated to evaluate the impact of coupon values on the market shares of national brand and private label food products

(cereal, yogurt, and spaghetti sauce). The data were derived from the Nielsen Homescan panel data eventually aggregated into 156 weekly observations.

According to the estimation results, the uncompensated own-price elasticities for all brands of each of the three products were negative, statistically significant, and less than unity in absolute value, suggesting an inelastic demand. The latter implies that in order to increase total revenue, the manufacturers of cereal, yogurt, and spaghetti sauce brands had to increase their prices.

The expenditure elasticities of all brands of all the three products were positive and statistically significant, meaning that all the brands were normal goods and the quantity purchased of all brands increased with the increase in total expenditure. According to the positive compensated cross-price elasticities, a substitutability relationship was established for the most of the brands.

Market share elasticities with respect to coupon values showed that coupon values positively impacted the market shares of General Mills, Kellogg's, Yoplait, Ragu, Classico, and other brands of spaghetti sauce, and negatively impacted the market shares of private label of cereal and spaghetti sauce and other brands of yogurt. As such, it can be concluded that coupons had a varied effects on markets shares across national brands and private labels.

References

Ailawadi, K. L., Lehmann, D. R., & Neslin, S. A. (2001). *Market Response To a Major Policy Change in the Marketing Mix: Learning from P&G's Value Pricing Strategy.*

Attfield, C. L. (1983). Homogeneity and Endogeneity in Systems of Demand Equations. *Journal of Econometrics 27*, 197-209.

Berndt, E., & Savin, N. (1975). Estimation and Hypothesis Testing in Singular Equation Systems with Autoregressive Disturbances. *Econometrica 43*, 937-957.

Deaton, A. (1980). Demand analysis, in: Z. Griliches and M. Intriligator, eds. *Handbook of Econometrics*.

Dong, Diansheng, Kaiser, Harry. (2005, August). Coupon Redemption and Its Effect on Household Cheese Purchases. *American Journal of Agricultural Economics*, 689-702. Retrieved November 20, 2016

Durbin, J., & Watson, G. (1951). Testing for Serial Correlation in Least-Squares Regression. *Biometrika 38*, 159-171.

Goodwin, B. K. (1992, July). An Analysis of Factors Associated with Consumers' Use of Grocery Coupons. *Journal of Agricultural and Resource Economics*, 110-120. Retrieved September 05, 2016, from http://www.jstor.org/stable/40986744?seq=1#page_scan_tab_contents

Green, R., & Alston, M. J. (1990). Elasticities in AIDS Models. *American Journal of Agricultural Economics*, 442-445.

Gupta, S. (1988, Nov). Impact of Sales Promotions on When, What, and How Much to Buy. *Journal of Marketing Research, 25*(4), 342-355.

Inmar Inc. (2014). *2014 Coupon Trends.* Winston-Salem. Retrieved September 10, 2016, from http://go.inmar.com/rs/inmar/images/Inmar_2014_Coupon_Trends_Report.pdf

Judge, G., Hill, R., Griffiths, H., Luekepoh, H., & Lee, T. (1988). Introduction to the Theory and Practice of Economics.” . *New York: John Wiley & Sons, Inc.*

Lluch, C., & Williams, R. (1974). Consumer demand systems and aggregate consumption in the U.S.A.: An application of the extended linear expenditure system. *Canadian Journal of Economics 8*, 49-66.

Montaldo, D. L. (2016, November 07). *Understanding the Different Types of Grocery Coupon*. Retrieved November 10, 2016, from The Balance: https://www.thebalance.com/understanding-the-different-types-of-grocery-coupons-940491

Nevo, A., & Wolfram, C. (2002). Why do manufacturers issue coupons? An empirical analysis of breakfast cereals. *RAND Journal of Economics*, 319-339. Retrieved September 05, 2016, from http://faculty.wcas.northwestern.edu/~ane686/research/coupons.pdf

Price, G. K., & Connor, J. M. (2003). Modeling Coupon Values for Ready-To-Eat Breakfast Cereals. *Agribusiness., 19*, 223-243. Retrieved October 26, 2016

Sethuraman, R., & Mittelstaedt, J. (1992, November). Coupons and private labels: A cross-category analysis of grocery products. *Psychology and Marketing*, 487-500. Retrieved September 07, 2016, from https://www.researchgate.net/publication/229467049_Coupons_and_private_labels_A_cross-category_analysis_of_grocery_products

Summers, R. (1959). A note on least squares bias in household expenditure analysis. *Econometrica 27*, 121-126.

United States Bureau of Labor Statistics. (2016). *United States Bureau of Labor Statistics*. Retrieved from Bureau of Labor Statistics: https://www.bls.gov/

Zellner, A. (1962). An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias. *Journal of American Statistical Association 57*, 348-368.