Advertising Effectiveness during the Great Recession: the Case Study of Three FMCG Italian Food Categories

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Abstract: - The present study is concerned with the reactions of consumers and firms to economic downturns. Specifically, it investigates to what extent the advertising has been used as marketing instrument to support brand sales during the downturn in business cycle (Great Recession 2011-2015) and whether advertising expenditures has significantly increased sales. The focus is on three Fast Moving Consumer Goods (FMCG) Italian food categories. We use Auto-Regressive Distributed Lag models (ARDL). As a whole, our results support the presence of significant effects of own advertising for a selection of brands, not the whole, within the three analyzed categories. Moreover, advertising spending by competitors acts negatively in two categories out of three.

Key-Words: - Advertising Effectiveness, Marketing during Recession, Promotions, Market Response Model, Long-Run Effectiveness.

1 Introduction

In recent years, the intervention of the Great Recession, started in the United States in late 2007, and spread worldwide mainly from 2009, has promoted a renewed attention to study the influence of macroeconomic cycle on relevant economic features, such as credit market, inequality, consumption, unemployment and others ([3], [4], [5], [6], [10], [16]). The present study primary focus on effects of macroeconomic cycle on markets and marketing strategies. In this framework, a number of meta-analysis and empirical reviews have been run ([15], [18], [19]) in order to identify the more frequent reactions to downturns in terms of consumers' behaviours and firms' strategies, and to help companies to fine-tune better strategies to improve their performance. The majority of the studies confirm the evidence of different compositions of the marketing mix and of their effectiveness between expansion and contraction periods. During recessions, consumers reduce their spending, for instance by switching from national to private label brands, and companies react changing the marketing mix, reducing prices, postponing investments, and cutting communication spending ([14], [18], [19]).

Within this literature, the present study investigates to what extent advertising has been used as marketing tool to support brand sales during the downturn of business cycle. It also investigates whether advertising spending has significantly increased sales. The focus is on three FMCG Italian food categories.

Previous contributes posing the emphasis on advertising find that advertising expenditures during downturns offer higher benefits than during expansions ([10]). Maintained or increased advertising investments during economic contractions have been found to produce positive results for firms in many other studies ([7], [12], [17]). Concerning the effectiveness as a marketing tool, Van Hardee et al. ([19]) find that own and cross-price elasticities increase during contractions, while long-term advertising elasticity increases during expansion. At the same time, they also observe that patterns considerably differ across categories and brands. Despite this theoretical evidence, pro-cyclical adjustments of advertising spending to downturns are documented across 37 countries worldwide in all traditional media ([7]). Indeed, Van Heerde et al. ([19]) document that in 2009 worldwide advertising expenditure dropped about 11%, and that, in order to sustain sales, brand managers recur to promotions. Just as for many other countries, the Great recession acts like an earthquake also on Italian markets; from 2007 to 2013 aggregate food and non-food consumers' expenditures, in real value, respectively decrease of 18.7% and of 14.7% ([11]). The present study focuses on the effectiveness of marketing expenditures on the main brands of three

food Italian categories of products during the Great Recession. We are aware that, to be very general, extremely large data set are required, in term of years, products and brands. Besides, the heterogeneity has to be explored also across countries and maturities of markets. This study has not the ambition to provide generalizations, but rather of providing further empirical findings, over which future studies may run meta-analyses to derive generalizations.

The paper is organized as follows. In Section 2, we describe the data and main aggregate evidences. Section 3 focuses on the methodology of the study. In Section 4, the results obtained with the proposed approach are illustrated. In Section 5 main conclusions are drawn.

2 Data and stylized facts

The study is based on a data set containing monthly data on sales, promotions and advertising spending over a number of brands within three categories of food FMCG, tea beverages, breakfast cereals and yogurt, during the period November 2010 - October 2015. Data are provided by IRI Infoscan and ACNielsen, which are primary global firms in the field of market research and market intelligence. IRI Infoscan run a store panel that entails about 70% of grocery and packaged food sales in Italy. AC Nielsen estimates advertising investments by a survey of all ads on traditional media and internet.

During the Great Recession, the analyzed categories (tea, yogurt and cereal for breakfast) faced difficulties and recorded negative sales and severe, in line with what has already been highlighted with reference to the whole food sector.

The tea-based beverage market (Fig. 1), after a decline in sales volume between 2011 and 2014, turns to increase during 2015. The yogurt and breakfast cereals markets (Fig. 2 and 3) during all the period exhibit negative variations in sales volume, even if of lower extent than for Tea. Promotions are intensively used in all of the three categories. Share of sales on promotion increases of about 20% for Cereals and Tea, of about 8% for Yogurt; at the same time regular prices shown little variations. This confirms the findings of Ang ([1]) and Koksal and Ozgul ([13]) that firms, instead of lowering prices, offer promotional discounts, which allow them to keep their market shares during crisis, although leads to lower profitability. Finally, as regards advertising investments, in the three categories there is a strong decrease, of the order of -60% for cereals and yogurt and -40% for tea.

To assess the impact of marketing mix variables on sales, we select the first 5 brands in term of market share, which explain about 80% of the market share of the entire categories. In Figure 1 to 3, Panels B, marketing metrics are averaged over the time window, and subsequently scaled for the maximum over brand, to give an idea of the marketing competitive strategy which each brand adopted during the period. The leader brand of each category is also the most investing on advertising. Indeed, note that brand in two out of three categories, Yogurt and Cereals, the brand more involved in promotion is the first of the followers.

3 Methodology

We are interested in the impact of advertising and promotions on sales, and to this purpose, we have to control for other relevant available variables such as price and distribution, own and concurrent, contemporaneous and lagged.

To evaluate effectiveness of marketing mix, for the main brands in each category, we recur to market response models through the specification of Auto-Regressive Distributed Lag models. We regress the dependent variable on the lag values of dependent variable itself, and current and lagged values of explanatory variables. As dependent variable, we use logarithmic transformations of sales in volume. As explanatory variables, we use, log transformations of prices, advertising spending, share of sales sold on promotion, weighted distributions. For any covariate own and competitors' values are considered.

In every category, for each brand, firstly we test the presence of stochastic trend using the ADF test, which always reject the hypothesis of presence of unit root. Series of all categories are trend stationary; series of Tea and yogurt display heavy seasonal effects. Volume sales series for each brand belonging to these two categories were depurated from the seasonal component using the ARIMAX12 routine ([8]). Then, market response models are specified, which allow us to measure the long-run effectiveness of marketing strategies ([2], [9]). In particular, as Auto-Regressive Distributed Lag (ARDL) models, in order to assess the impact that marketing and competition variables have on sales of each brand:

$$Y_t = \alpha_0 + \sum_{i=1}^{k_0} \beta_{0i} Y_{t-i} + \sum_{i=0}^{k_1} \beta_{1i} X_{1,t-i}$$
$$+ \sum_{i=0}^{k_2} \beta_{2i} X_{2,t-i} + \cdots + \sum_{i=0}^{k_P} \beta_{Pi} X_{P,t-i}$$
$$+ \varepsilon_t$$

Figure 1 Tea Category
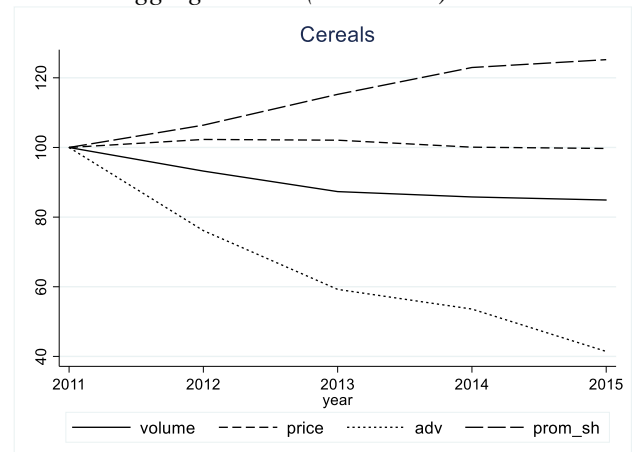*Panel A. Evolution of Marketing Metrics from 2011 to 2015. Aggregate data (2011=100).*
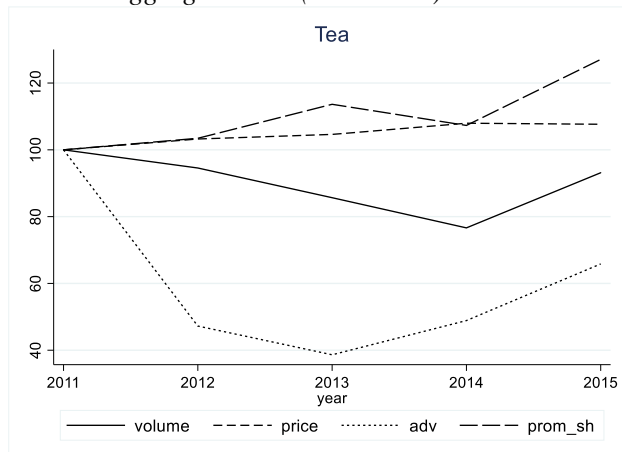
Panel B. Yearly averages of Marketing metrics by brand. (Maximum of Yearly averages over brands =100)

	A	B	C	D	E
Volume	**100.0**	95.7	42.0	16.0	9.9
Price	**100.0**	51.8	45.7	52.7	50.4
Advertising	**100.0**	47.6	20.9	2.3	2.5
Prom. %	26.6	90.4	**100.0**	89.8	81.6

Figure 2 Yogurt Category
Panel A. Evolution of Marketing Metrics from 2011 to 2015. Aggregate data (2011=100).

Panel B. Yearly averages of Marketing metrics by brand. (Maximum of Yearly averages over brands =100)

	A	B	C	D	E
Volume	**100.0**	96.2	74.6	10.0	4.5
Price	50.4	61.7	41.8	80.2	**100.0**
Advertising	**100.0**	23.2	9.3	8.4	22.6
Prom. %	87.4	**100.0**	85.0	85.8	77.2

Figure 3 Breakfast Cereals Category
Panel A. Evolution of Marketing Metrics from 2011 to 2015. Aggregate data (2011=100).

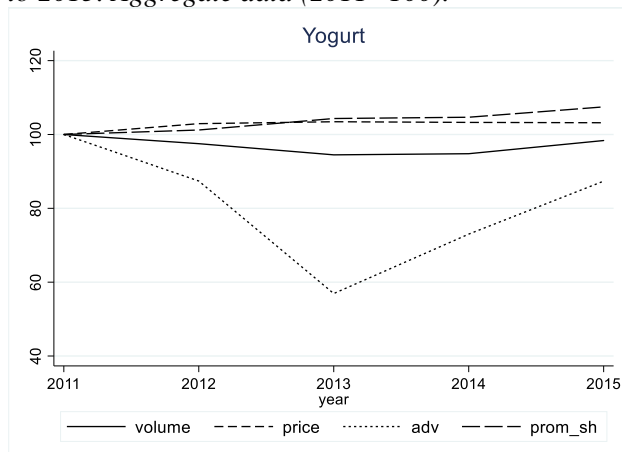*Panel B. Yearly averages of Marketing metrics by brand. (Maximum of Yearly averages over brands =100)*

	A	B	C	D	E
Volume	**100.0**	36.6	7.9	4.8	0.7
Price	80.1	82.2	**100.0**	94.1	66.7
Advertising	**100.0**	29.2	11.3	1.6	4.9
Prom. %	83.9	**100.0**	98.6	62.9	13.6

The response variable represents the average weekly sales volume (log-transformed) recorded in each month, Y_t, which is regressed on its own lags and on current and past values of other independent variables (own and competitors' log-transformations of price, advertising spending, promotion share, weighted distribution). The estimation are attained using OLS method, with heteroscedasticity consistent standard errors. For each brand, the lag order has been chosen by minimizing the AIC criterion.

Subsequently, for each specification we compute the cumulative advertising and promotional effects and test the null hypothesis of null cumulative effect. The long-run coefficient associated with each *p*-th variable, β_p^{lr}, is computed as :

$$\beta_p^{lr} = \frac{\sum_{i=0}^{k_p} \beta_{pi}}{1 - \sum_{i=1}^{k_0} \beta_{0i}}$$

4 Estimation results
The results of the estimation are presented in Tables 1 to 3. For each brand in the three categories, we present estimates of long-run coefficients as results

of the ADRL specification (Detailed estimation results are available, upon request). We display long-run coefficients of promotions and adverting spending, on which we are mainly interested. Moreover, as it is usual at this level of granularity that many coefficients are not significant, we shall focus only on the significant ones, and on the degree according to which they confirm expectations.

In the tea category (Table 1), we scantly found significant effects for the advertising. We test the null hypothesis that the cumulative effect is equal to zero, i.e., that there is not a long-term effect of the advertising investment to sales. The test distribution may be approximated by a χ^2 variable. The null hypothesis is rejected in favor of positive long-run effects for two brands. This implies the presence of a long-term effect of advertising investment on sales of these brands. Long-run effects to own advertising are retrieved significant for the leader brand A and the brand E. At the same time, a significant negative impact of competitors' advertising is found only for the leader brand A. Concerning promotions, we may observe significant positive effects of own promotions on sales in volume of three brands and significant negative impact of concurrent promotions of four brands.

Passing to the first 5 brands of the yogurt category (Table 2), we again find expected positive impacts of own advertising on the leader brand and a further brand. Moreover, we find a negative impact of concurrent advertising for the leader brand. Note that within the Yogurt category, both own and concurrent promotions, when significant, negatively impact.

The breakfast cereals category displays the most favorable results regarding the advertising effectiveness, whose impact in this category results significantly effective. Advertising, more often than in the previous categories, for four out of five brands, is found to induce a significant positive increase on sales. Moreover, for this category, also concurrent advertising display positive reactions, for three brands out of five. As regard as to promotions effects, impacts are of mixed sign.

Table2 Yogurt category: Long-Run Multipliers

	Adv own	Adv cunc	Prom % own	Prom % cunc
	Brand A			
Coef.	3.3E-07	-1.6E-07	-6.956	2.110
Std.Err.	3.205	8.368	14.078	2.063
P>|t|	0.073	0.004	0.000	0.151
	Brand B			
Coef.	5.6E-08	-5.5E-09	-2.498	-2.922
Std.Err.	0.334	0.021	4.927	28.246
P>|t|	0.563	0.884	0.026	0.000
	Brand C			
Coef.	1.0E-06	3.1E-08	1.168	-1.353
Std.Err.	2.094	0.998	0.331	4.710
P>|t|	0.148	0.318	0.565	0.030
	Brand D			
Coef.	-1.8E-08	5.0E-08	-1.455	-0.177
Std.Err.	0.000	0.941	0.634	2.861
P>|t|	0.983	0.332	0.426	0.091
	Brand E			
Coef.	2.3E-06	7.3E-08	0.875	-3.459
Std.Err.	6.858	0.248	0.181	1.431
P>|t|	0.009	0.619	0.670	0.232

Table 1 Tea category: Long-Run Multipliers

	Adv own	Adv cunc	Prom % own	Prom % cunc
	Brand A			
Coef.	2.40E-07	-1.40E-07	0.174	*-0.177*
Std.Err.	6.370	6.958	1.016	2.861
P>|t|	0.012	0.008	0.314	0.091
	Brand B			
Coef.	1.60E-07	1.70E-08	-0.087	-0.486
Std.Err.	1.230	0.139	0.298	5.05
P>|t|	0.267	0.709	0.585	0.025
	Brand C			
Coef.	1.30E-07	4.30E-08	0.881	-2.969
Std.Err.	0.163	0.060	19.781	27.272
P>|t|	0.686	0.807	0.000	0.000
	Brand D			
Coef.	1.10E-06	8.00E-08	*0.983*	-0.84
Std.Err.	0.839	0.346	3.234	1.599
P>|t|	0.360	0.556	0.072	0.206
	Brand E			
Coef.	5.70E-06	6.30E-09	1.036	-1.438
Std.Err.	17.174	0.022	39.822	24.56
P>|t|	0.000	0.882	0.000	0.000

Table 3 Breakfast Cereals: Long-Run Multipliers

	Adv own	Adv cunc	Prom % own	Prom % cunc
	Brand A			
Coef.	2.4E-07	2.4E-07	-1.665	-0.278
Std.Err.	17.715	4.536	4.321	0.211
P>|t|	0.000	0.033	0.038	0.646
	Brand B			
Coef.	6.5E-07	1.2E-07	-2.865	-1.038
Std.Err.	14.357	3.016	13.233	1.567
P>|t|	0.000	0.082	0.000	0.211
	Brand C			
Coef.	5.6E-07	6.3E-08	1.998	1.072
Std.Err.	9.096	2.519	150.235	8.512
P>|t|	0.003	0.113	0.000	0.004
	Brand D			
Coef.	4.2E-06	2.8E-07	1.326	0.265
Std.Err.	16.892	30.304	19.374	0.309
P>|t|	0.000	0.000	0.000	0.578
	Brand E			
Coef.	3.4E-07	1.1E-07	0.982	1.197
Std.Err.	0.049	1.594	1.533	1.457
P>|t|	0.824	0.207	0.216	0.227

As a whole, our results, also during a relevant contraction of aggregate advertising investment, support the presence of positive significant effects of own advertising for a selection of brands, not the whole, within the three analyzed categories. Moreover, advertising spending by competitors act negatively within the tea and yogurt categories and positively within the breakfast cereals one.

As regard as the effects of promotions, these are more often significant, but of mixed sign.

Concluding, advertising is found to increase sales, when significantly impacts on them, while promotions are found also to work against the expected directions.

5 Main Conclusions

We investigate the cumulative impact of advertising on sales at a high level of granularity, focusing over the Italian main brands of three categories of food products of the FMCG (tea, yogurt and breakfast cereals) during a recession period.

During the Great Recession, the analyzed markets were forced to face difficulties, and recorded negative changes in their sales. The total advertising budget within the three categories have been more than halved. Evaluating the advertising effectiveness, at brand level, we attain highly heterogeneous findings. We find positive significant long-run effects of own advertising for a selection of brands, in the Tea and the Yogurt categories, and for the most of brands within the category of Cereals. Moreover, competitors' advertising spending impact negatively within the tea and yogurt categories and positively within the breakfast cereals one. On the contrary, promotions are found very often significant, but their long-run impact may be favorable but also not favorable for brand sales' volumes.

In conclusion, our study is the first, at the best of our knowledge, which investigates the responses of sales to marketing instruments in Italy during the recent Great Recession. Using data by ACNielsen and IRI Infoscan, we get a consistent measurement and modelling scheme across brands, which in addition enables researchers to run meta-analysis. We estimated dynamic models for each categories that provides us of short term and long term advertising coefficients, as well of other marketing instruments coefficients. Our results show that tea based beverages are little influenced by advertising (a similar result is obtained by Van Herde at al., 2013), while the other two food categories are price inelastic and show a high responsiveness to advertising investments.

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