Memo on Fueling Sales at EuroPet

By Jianqiu Chen

Student number 1000151211

Course: Eco404

Prof: Ajaz Hussain

Date: 2015/11/03

**Introduction:**

EuroPet, an Europe-based corporation whose core business is the sale of fuel to retail customers, is suffering from fierce market competition. Because of the consistent underperformance of EuroPet’s C-stores, the management begins to question the effectiveness of the company’s large investments in advertising on its C-stores. This puts Blanchard, an executive who worked in the retail marketing department of the EuroPet S.A., under pressure to deliver quantitative proof of the effectiveness of the marketing campaign. If Blanchard was unable to prove that the company’s return on investment of advertising had been satisfactory, the management would cut the budget for advertising permanently. This memo attempts to help Blanchard measure the effectiveness of his marketing strategies in a quantitative way and compare the rate of return found to the benchmark set by the department.

**Agenda:**

The memo will first summarize and explain the dataset provided by Blanchard. Then, it will go through a process of statistical testing that is required by the case as well as answering all Blanchard’s questions. Also, the memo will attempt to measure the effectiveness of the advertising campaign as well as diagnose errors and verify some of the assumptions. Finally, a recommendation would be presented to Blanchard as to how he should communicate the results to his supervisor.

**Overview and Background:**

EuroPet S.A. is a multinational company operating gas stations in many European countries. Recently, the company is experiencing slumping sales in at the c-stores. As the case described, there are 3 different types of EuroPet c-stores: Europet Compact, which comprises 45% of all EuroPet sales, EuroPet Regular which accounts for 35% of all Europet’s stores, and finally, Europet One-Stop which is the remaining of the business. Traditionally, Europet’s main competitors had been supermajor energy companies such as PetroAmerica, InterOil, and RoyalScandia. More recently, other “home-branded” gas stations, operated by different supermarkets had been winning market share. Despite taking a low fuel price position similar to that of the supermarkets, EuroPet had been unable to retain its market share. This trend therefore put a lot of questions on the effectiveness of EuroPet’s advertising campaigns since some of EuroPet’s competitors such as MarcheLocal and Metra hardly advertise at all. Hence, Blanchard is now urgently asked to quantitatively test the effectiveness of the marketing campaign. The way Blanchard attempts to carry out the test is to use all EuroPet’s c-stores in Marseille, France, as a sample to draw inference on the actually effectiveness of the campaign. The details for testing the effectiveness are already planned out by Blanchard and the variables he collected data on are well described in the case as well, the end goal is to compare the overall benefits of advertising to the advertising costs and use that comparison to make judgement.

**Analysis:**

1. The memo first summarizes the variables that Blanchard collected data on:



1. After running a regression simply between sales and fuelvolume, one gets the following results:



According to the results, the relationship between sales and fuelvolume is statistically significant.

b) and c) one can summarize the estimates as the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Fuel volume | 56259(min) | 68549(max) | 62852.76(average) |
| Sales | 21323 | 24950 | 23210 |
| Expected sales | 18809.35 | 26739 | 23055 |
| Prediction Interval | (17640, 19978) | (25710, 27768) | (22679, 23454) |

d) The results seem to suggest that 1 liter increase in average volume of fuel sold per Europet facility tend to lead to a 0.645 euros increase in the sales, holding all other variables constant. Certainly, at this point, it is very hard to conclude any causal relationship.

3) Now, if one runs the regression of sales against TV and radio GRPs, one will obtain the following:



1. As one can observe at the first glance, that both coefficients are statistically significant by setting the alpha to be 10%
2. An estimate for sales at TV=40, radio=80 is 23045.59
3. Prediction interval
4. In order to verify the effectiveness of both radio and TV, it is important to do an investment versus sales comparison. So we need to multiply our TV data by 300 and radio data by 25, since 300 and 25 are average prices for each specific unit of TV and radio respectively.

So, after transforming the data, we get the following results:



As expected, the statistical significance has not changed for any of the variables as one only scaled both variables by a constant. The results seem to suggest that, holding all other variables constant, 1 euro of TV ads creates only 40cents of sales and 1 euro of radio ads only creates 20 cents of sales. TV seem to be more effective than radio.

4). To address Tyler’s concern, one can now run a regression with the previous 2 variables as well as temperature and get the following results:



As one can see, the coefficient of radio becomes insignificant as one adds temperature as predictor variable, while the statistical significance of TV remains while the magnitude becomes slightly smaller. Although this is not a vigorous proof, Tyler’s point appear to be justified. That is the effect of radio advertising is largely captured by the variations in temperature.

b) According to the following table, TV advertising still appears to be profitable given the mf is still 3.

The net impact of ads on sales would be 3\*11.2975/300=1.13, which is greater than 1, this implies that every euro of ads investment generates and overall of 1.13 euros in sales.



c) In order for the ads to be profitable, the coefficient of TV has to be greater than 10.

5)

a) By adding all variables in the dataset, one can obtain the following regression results: 

Final equation: Sales = 12050+94.63Fuelprice+102.92Temp-157.09precipitation+973.92\*holiday-134visits

To interpret this final equation: one would say: holding all other variables constant,

* 1 euro increase in fuel price leads to 94.63 euros increase in sales
* 1 degree increase in temperature leads to 102.92 euros increase in sales
* 1 millimeter increase in precipitation leads to 157.09 decrease in sales
* If the week contains holidays, the week would generate 973.92 euros more sales than in weeks where there is no holidays
* 1 more rating in survey response leads to a decrease of 134 euros in sales.

One does not include TV and radio ads in the equation since they are not statistically significant given the 10% requirement. Therefore, if one uses this equation, TV and radio ads are not effective. Nevertheless, there’s problem with this equation. The variable visits is certainly a variable one needs to question on. First, this variable is generate through survey, which is already subject to many possible bias. Secondly, the sign of the variable appears to be wrong, more visits should lead to more sales, not less. Therefore, one should run a regression without visits. Furthermore, the holiday variable is not very precise since it is a dummy variable that would take the value 1 if there was at least one day of public or school holiday, and 0 otherwise. However, it is hard to classify holidays as some are more important than the others. Also, a long weekend with a free Monday is certainly different than a spring break for the entire week. For all these reasons, one can exclude holiday from the regression as well, just for now, and obtain the following results:

b) 

Now as one can see, the coefficient of TV becomes significant again, however, the number is too small to be profitable, notice that the “actualtv” variable is (tv/300)

6) Now, in order to clarify Blanchard’s concerns, one can add holiday back into the regression and obtain the following results:

The results suggest holiday does have a significant influence on the weekly sales, however, this is not a vigorous proof of the causal relationship between holiday and sales.

**Conclusion:**

Brief, after running the procedure required by Blanchard, one arrives at very inconclusive results regarding the effectiveness of EuroPet’s advertising campaign. However, if one assumes that the variables that Blanchard has collected were all very important, one could say the effectiveness of the TV ads is statistically significant, not the radio ads, however. Finally, none of them are profitable in order for the company to make a positive return on investment.