

Examen Marketing Strategy Modelling

Januari 2022

Prof Lien Lamey / 2.5h / 4 open questions

1. Question about competition: A linear model to model the sales of Coca Cola was given. There are 3 brands in the market: Coca Cola, Pepsi and a Private Label.

- a. Explain how you would improve this model to get more insights?

Motivate briefly

- Indirect approach: $Q_{it} = Q_t * m_{it}$ to distinguish between category sales effects and brand market share effects. (1x)
- Combination of multiplicative interaction as price follows the shape of this model and multinomial logit model as advertising follows the shape of this model. Something like this: (1x)

$$m_{it} = \frac{\alpha_i p_{it}^{\beta_p} e^{\beta_a a_{it}}}{\sum_{c=1}^4 \alpha_c p_{ct}^{\beta_p} e^{\beta_a a_{ct}}}$$

- b. How would you include reaction of Pepsi towards Coca-Cola's advertising?

LNB model (1x)

Demand function of Coca: $msh_j = \alpha msh_{j,-1}^\lambda (p^r)^{\beta_p} (a^r)^{\beta_a}$

Reaction function of Pepsi: $a_c = \alpha_a (p^r)^{\rho_{a,p}} (a^r)^{\rho_{a,a}}$

- c. When should Pepsi NOT react to the advertising attack of Coca cola? Include cross market share effect, competitive reactions effect and own market share effect.

With i = Coca Cola, j = Pepsi

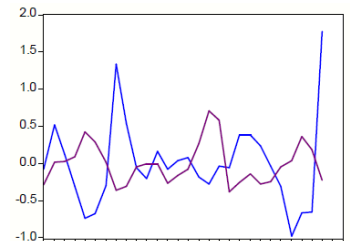
i : attacker brand j : defender brand		CROSS MARKET SHARE EFFECT ¹		X(i) -> MS(j)	
		YES	NO	YES	NO
		$\frac{\partial m_{sj}}{\partial u_{hi}} \neq 0$	$\frac{\partial m_{sj}}{\partial u_{hi}} = 0$	$\frac{\partial u_{fj}}{\partial u_{hi}} \neq 0$	$\frac{\partial u_{fj}}{\partial u_{hi}} = 0$
		COMPETITIVE REACTION EFFECT		COMPETITIVE REACTION EFFECT	
		YES	NO	YES	NO
		$\frac{\partial u_{fj}}{\partial u_{hi}} \neq 0$	$\frac{\partial u_{fj}}{\partial u_{hi}} = 0$	$\frac{\partial u_{fj}}{\partial u_{hi}} \neq 0$	$\frac{\partial u_{fj}}{\partial u_{hi}} = 0$
		X(i) -> X(j)			
OWN MARKET SHARE EFFECT	YES $\frac{\partial m_{sj}}{\partial u_{fj}} \neq 0$	A Intense Competition	C UNDERREACTION Lost Opportunity for Defender ²	E Defender's Game	G No Competition
	NO $\frac{\partial m_{sj}}{\partial u_{fj}} = 0$	B Spoiled Arms for Defender ²	D Ineffective Arms	F OVERREACTION Spoiled Arms for Defender ²	H No Competition
X(j) -> MS(j)					

2. Question about marketing strategy in turbulent times: Spanish Discounters

Share (Private label like Aldi, Lidl,...)

- a. Graph that looked a little bit like this was given of Spanish discounters PL share, periods of contraction and expansion and you had to explain what was happening

The Spanish discounter share behaves countercyclical. The share of Spanish discounters decreases in expansions and increases in contractions (2x)



- b. Give two methodological steps of how you derive cyclical component.

- i. Extract cyclical component (1x)

$$PLS_t^c = PLS_{k,t} - PLS_{k,t}^{trend}$$

- ii. Relating to the business cycle (2x)

$$PLS_t^c = \beta^{PLS} GDP_t^c + \eta_t$$

- c. How do you derive whether the economic cycle is responsible for the the growth?

$$\Delta PLS_t^{trend} = \delta + \phi contraction_t + \mu_t$$

With:

$$\hat{\beta}_i^{PLS} = \alpha + \sum_{k=1}^K \tau_k \hat{\beta}_i^{MM_k} + \sum_{l=1}^L \phi_l X_i^l + v_i$$

$$\hat{\phi}_i^{PLS} = \kappa + \gamma_{PLS} \hat{\beta}_i^{PLS} + \sum_{k=1}^K \gamma_k \hat{\beta}_i^{MM_k} + \sum_{l=1}^L \lambda_l X_i^l + \omega_i \quad (1x)$$

3. Question about CLV: Telecommunication company. The cost per customer was 40\$ + 60\$ per year. The revenues per customer was \$50 per month. Retention rate is 60% annually.

- a. Calculate lifetime value with constant margins

$$LV = m \left(\frac{r}{1 + i - r} \right)$$

$$LV = [(50 * 12 - 100) * 0.60] \div (1 + 0.10 - 0.60) = 500 * 1.20 = 600 \quad (3x)$$

- b. You have 100 000 customers. What is the maximum amount of money you should invest in marketing to increase the retention rate from 60% to 70%?

$$[(50 * 12) - 100] \div (1 + 0.10 - 0.60) = 500 * 1.20 = 600$$

$$[(50 * 12) - 100] \div (1 + 0.10 - 0.70) = 500 * 1.75 = 875$$

$$87\,500\,000 - 60\,000\,000 = 27\,500\,000 \quad (2x)$$

- c. Retention in this case

- i. Mention 2 drivers of retention for this case

Quality (good reception)

Price

ii. **Tell us which model to use for the drivers explained in i)**

Logit model (2x)

$$P(\text{Churn}) = \frac{1}{1 + \exp(\beta X)}$$

With x being the drivers described in (i)

4. **Question about firm value: event study of General Motors. The Event takes place on Sept 7. Use the day before and after to calculate the change in stock return.**

	Stock price general motors	General motors return	Market return NASDAQ
Sept 5
Sept 6			
Sept 7		0.01	
Sept 8			0.05

	Intercept α	Beta β	Var(error term)
General motors	-0.01	1	0.0003

Give the additional steps and calculate the change. Is this significant?

Step 6: Calculate expected returns

$$\text{Expected return}_t = \alpha + \beta * \text{market return}_t$$

Step 7: Determine cumulative abnormal returns

$$\text{Abnormal return}_t = \text{observed return}_t - \text{expected return}_t$$

$$\text{CAR} = \text{abnormal return(Sept 6)} + \text{abnormal return(Sept 7)} + \text{abnormal return(Sept 8)} \\ = 0.03 \text{ (1x)}$$

This is not significant as the standard deviation of the error term ($\sqrt{3 * 0.0003} = 0.03$) is equal to CAR (1x)