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CENTER FOR AGRO-FOOD ECONOMICS AND DEVELOPMENT

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

IRTA

MINISTERIO DE CIENCIA E INNOVACIÓN

The allocation of household food budget among shopping basket items: How is it influenced by promotions?

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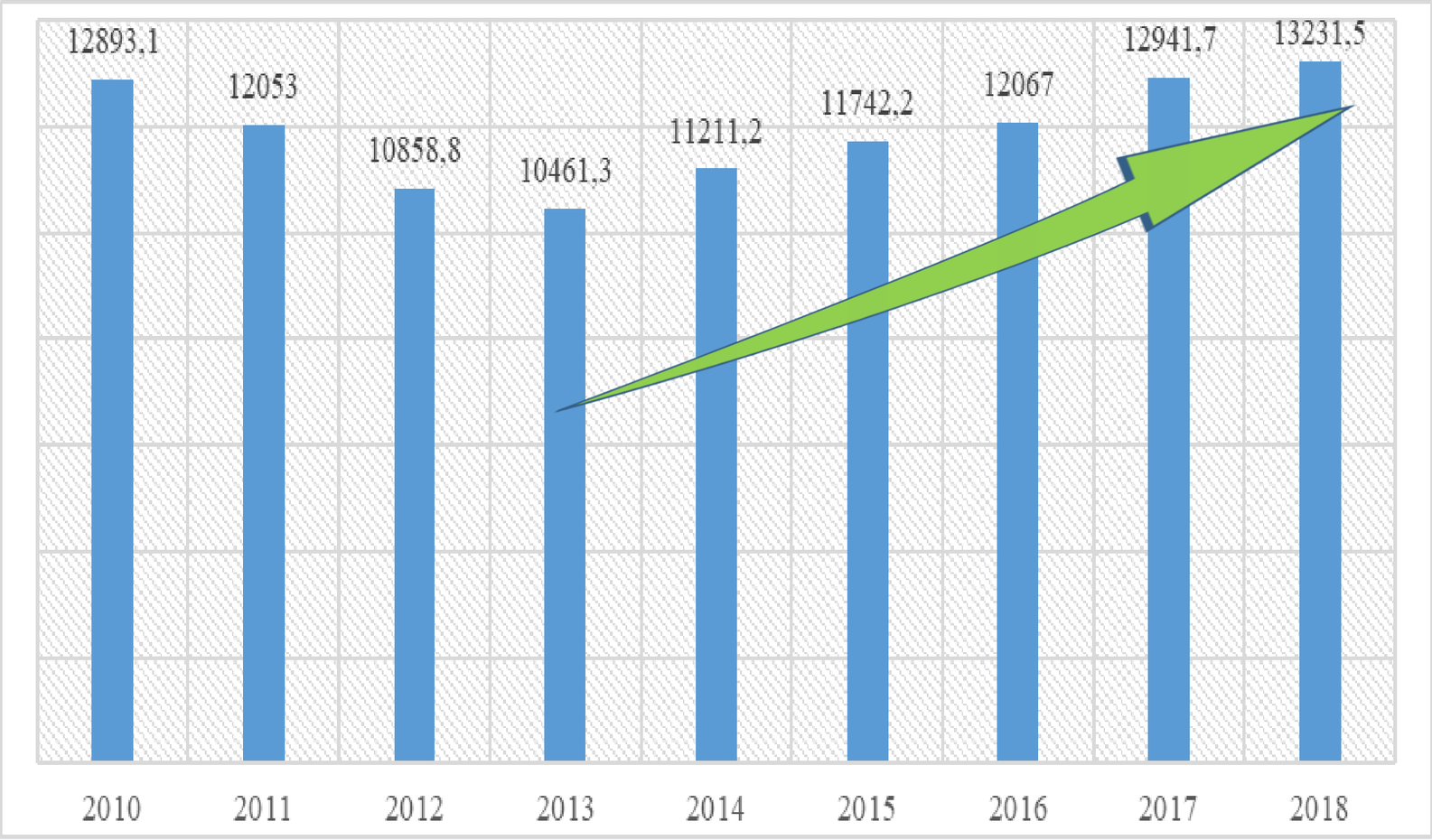
Research Background & Motivation

Research Background & Motivation



Promotional investment in Spain 2010-2018 (million €) (Benavides et al., 2020)

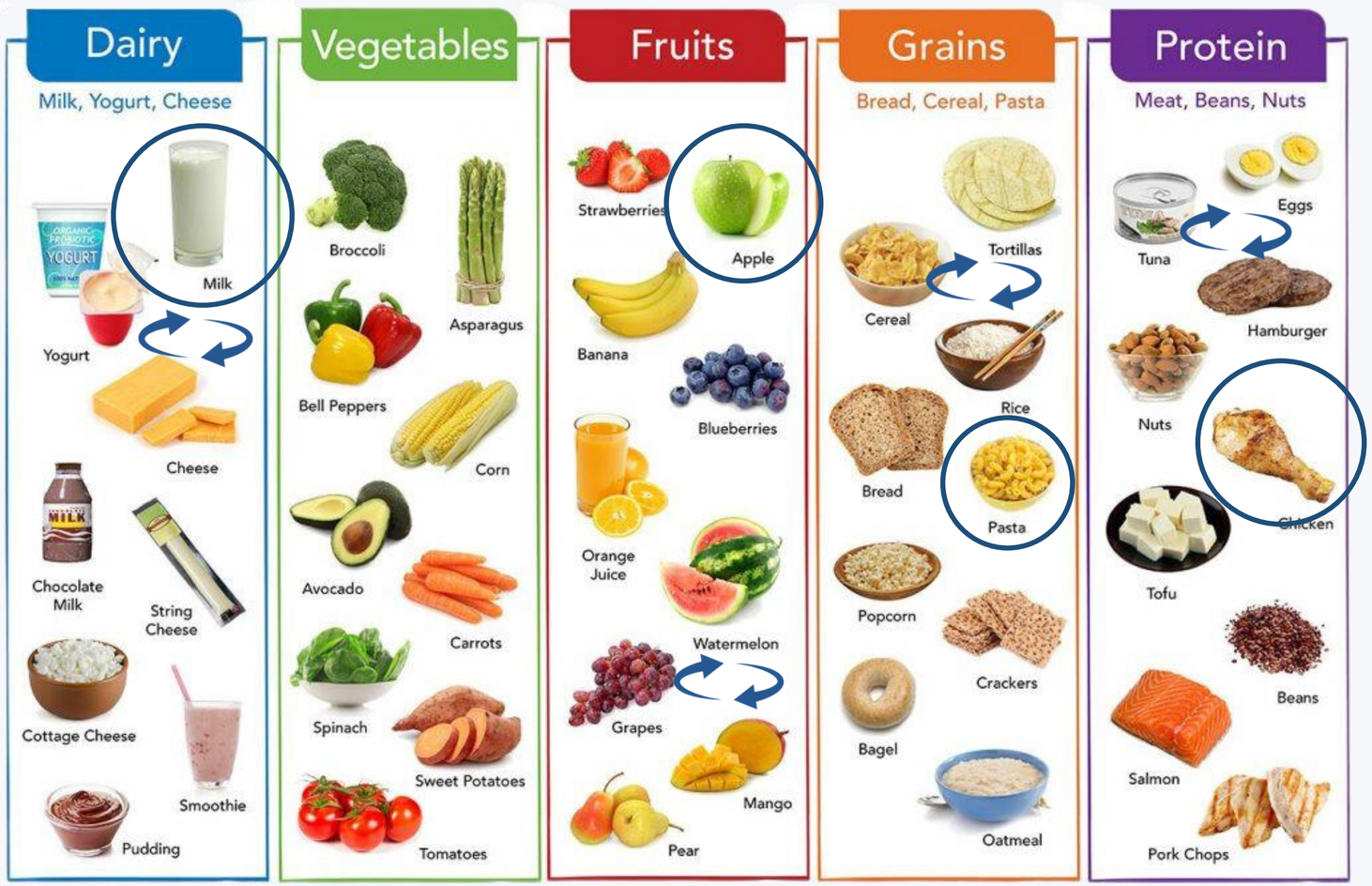
KANTAR WORLDPANEL

Promotions, the key to winning customers (2017)

113 new buyers

41%

Research Background & Motivation



Drèze et al., (2004)

Revoredo-Giha et al.,(2018)

section II

Research questions and objectives

Research questions

- To what extent do promotion and price induce households to change their shopping expenditure and budget allocation?

- Which category has the strongest effect on the expenditures when sold under promotion?

- What could the promotion cross-effects be among the categories of the shopping basket?

Objectives

- Study household budget allocation decisions in Spain.
- Estimation of the EASI demand system that allows for flexibility of Engel curves shapes additionally, budget share's error terms can be interpreted as unobserved preference heterogeneity since
- Estimation of the own and cross-promotion elasticities for a broader number of food categories.
- Give insight to retailers about the categories that are the most influenced by promotions and how households manage their shopping budget.

Section III

Data

Consumers' micro panel data from ©Kantar WorldPanel spinning from **December 30th, 2016, to December 30th, 2017.**

Supermarket

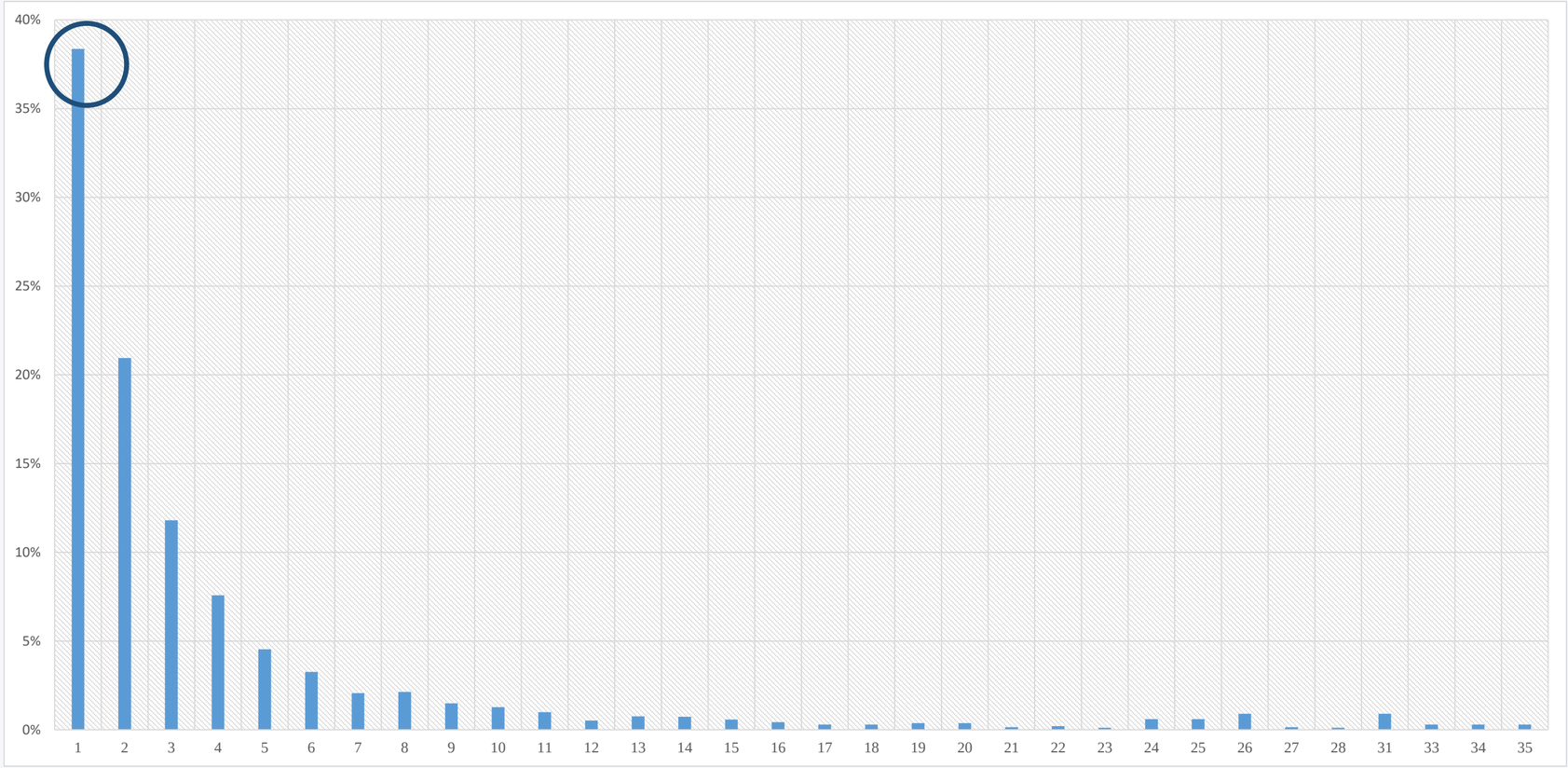
9.7% market share

High-low price

Frequent **promotions**

offers

1) Grains and grain-based products;2) Vegetables and vegetable products; 3) Starchy roots, tubers, legumes, nuts and oilseeds;4) Fruit, fruit products and fruit and vegetable juices; 5) Meat; 6) Fish and other seafood;7) Milk, dairy products and milk product imitate; 8) Cheese;9) Sugar and confectionery and prepared desserts;10) Composite dishes (animal and vegetable composite dishes); 11) Snacks and other foods; 12) Drinks13) Residual category.



Sample

- 3,564 observations,280 households
- At least 4 shopping trips during the whole period.

Section III

Methodology

Linear fixed effect regression model

$$\ln X_t^{(h)} = \alpha_0 + \sum_{g=1}^{17} b_g \ln P_{gt}^{(h)} + \sum_{g=1}^{17} c_g Pm_{gt}^{(h)} + r_t^{(h)}$$

Where:

- $X_t^{(h)}$ is household expenditures per shopping trip (t),
- $P_{gt}^{(h)}$ is the price of category (g) at time (t) for household (h),
- $Pm_{gt}^{(h)}$ Promotion index of category (g) during a shopping trip (t) made by the household(h),
- $r_t^{(h)} = H^{(h)} + u_t\,, u_t \sim i.i.d.\ \ N\,(0,\ \sigma_u^2)$,
- $H^{(h)}$ is a fixed effect specification to accommodate heterogeneity across households,
- $\alpha_0, b_g,\ \ and\ c_g$ are the regression coefficients, ln denotes natural logarithm.

Censored Exact Affine Stone Index (EASI) demand model

$$w_{hgt} = \sum_{g=1}^{G} A_{ig}\, lnp_{hgt} + \sum_{r=0}^{3} B_r y_{ht}^{r} + CPm_{hgt} + Dz_n + \delta R_{hgt} + \varepsilon_{hgt}$$

Where:

- w_{hgt} the expenditure share of the food category g for household h in period t,
- lnp_{hgt} the vector of logarithmic price indices,
- y_{ht}^{r} is the log total real expenditure ,
- Pm_{hgt} is a vector of promotional indices,
- z_n is an n vector of sociodemographic characteristics,
- R_{hgt} is the calculated Inverse Mills Ratio (IMR),
- ε_{hgt} is the error term capturing the unobserved heterogeneity,
- A, B, C and D are the coefficients to be estimated.
- Imposed restrictions: Adding-up, Homogeneity and Symmetry

Elasticities estimation

Compensated Hicksian price elasticities; $\epsilon = \overline{w}^{-1}(A) + \Omega\overline{w} - I$

Expenditure elasticities; $\vartheta = \overline{w}^{-1}(I + \Theta\acute{p})^{-1}\Theta + 1_g$

Uncompensated Marshallian price elasticities; $\theta = \epsilon - \overline{w}\vartheta$

Promotion elasticities; $\omega = \overline{w}^{-1}(C) * \overline{P}_m$

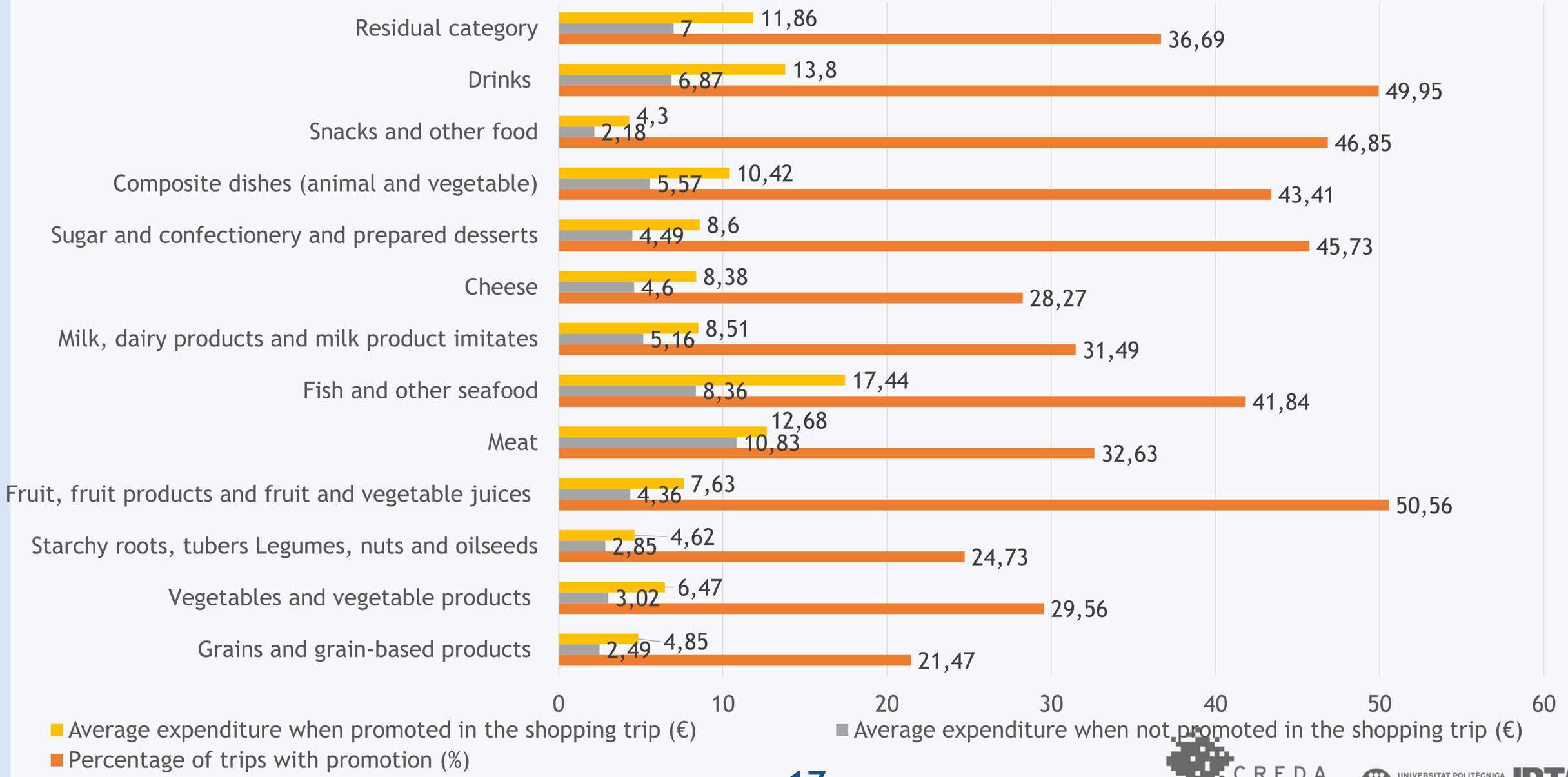
Section V

Research Results

Consumer profile

- Age: 36,76% (35-49 years), 43,21% (50-64 years)
- 52,5% (couples with children)
- 46,07% middle class, 21,43% middle high class
- 75,71% Spanish consumers
- 78,93% from Barcelona
- 58,22 % have 2 to 4 family members
- 19,43 average shopping trips

Preliminary impact of promotion on food categories



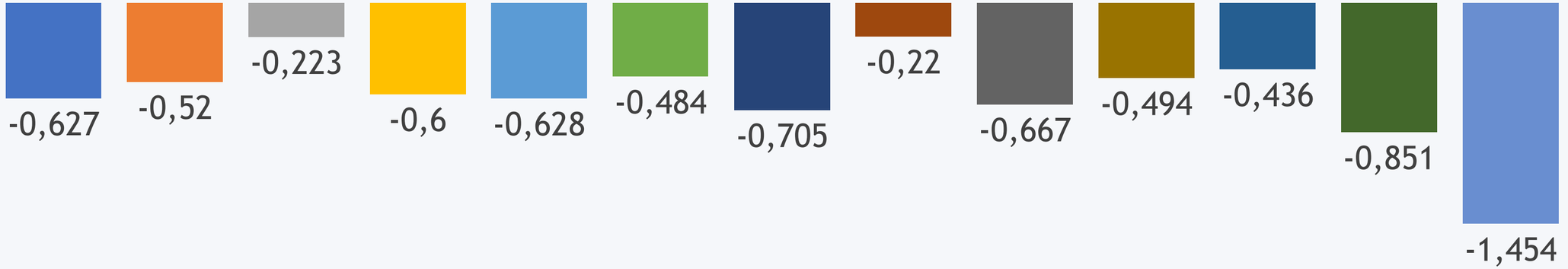
Estimation results of total expenditure regression

3564 observations, R^2=0,326

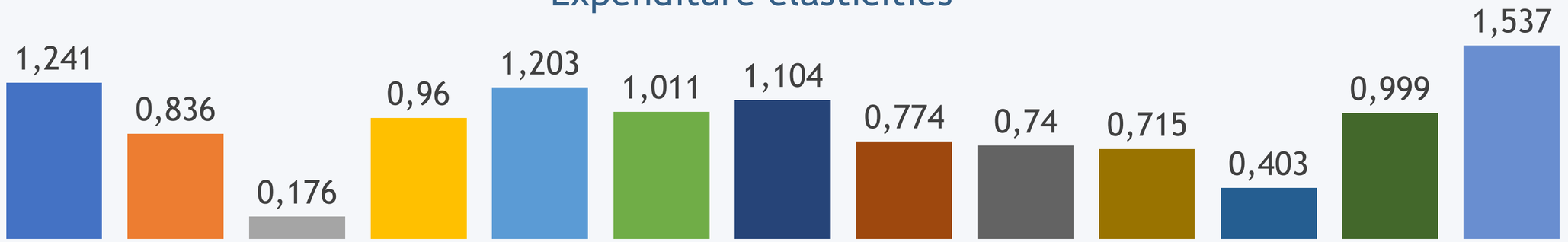
Food Categories	Prices	Promotions
Grains and grain-based products	0,051***	0,359***
Vegetables and vegetable products	0,029**	0,43***
Starchy roots, tubers, legumes, nuts and oilseeds	0,039***	0,407***
Fruit, fruit products and fruit and vegetable juices	0,092***	0,802***
Meat	0,115***	0,694***
Fish and other seafood	0,107***	0,858***
Milk, dairy products and milk product imitates	0,043***	0,602***
Cheese	0,104***	0,4***
Sugar and confectionery and prepared desserts	0,072***	0,705***
Composite dishes (animal and vegetable composite dishes)	0,041***	0,806***
Snacks and other food	0,125***	0,125
Drinks	0,082***	0,655***
Residual category	0,004	1,046***
Intercept	3,286****	

(***) stands for statistically significant at 1%.

Price elasticities

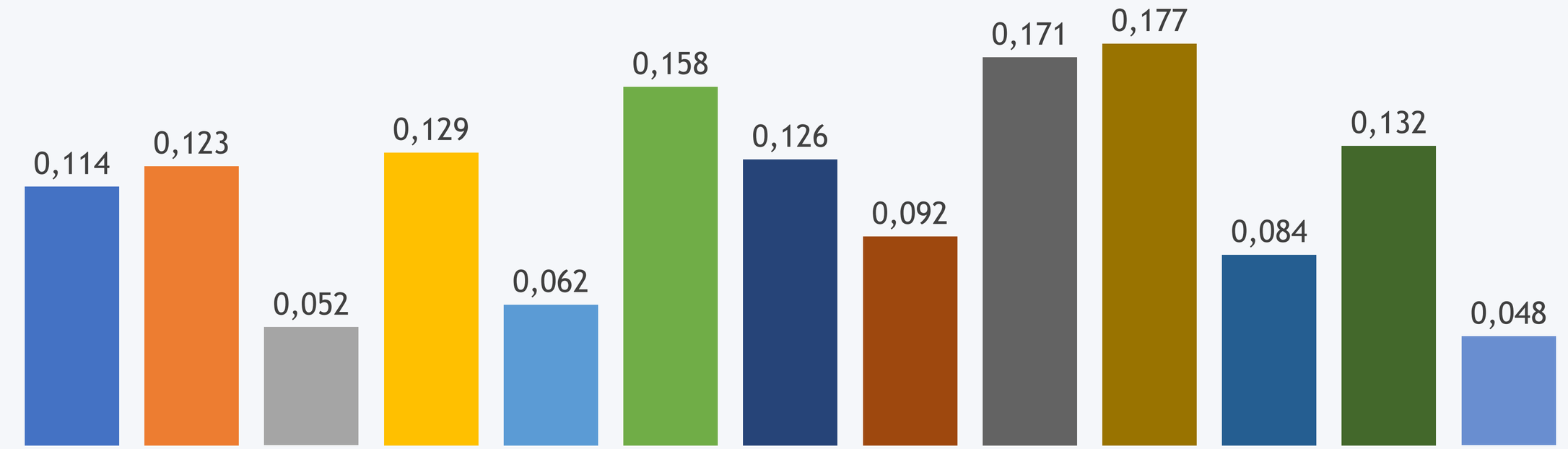


Expenditure elasticities

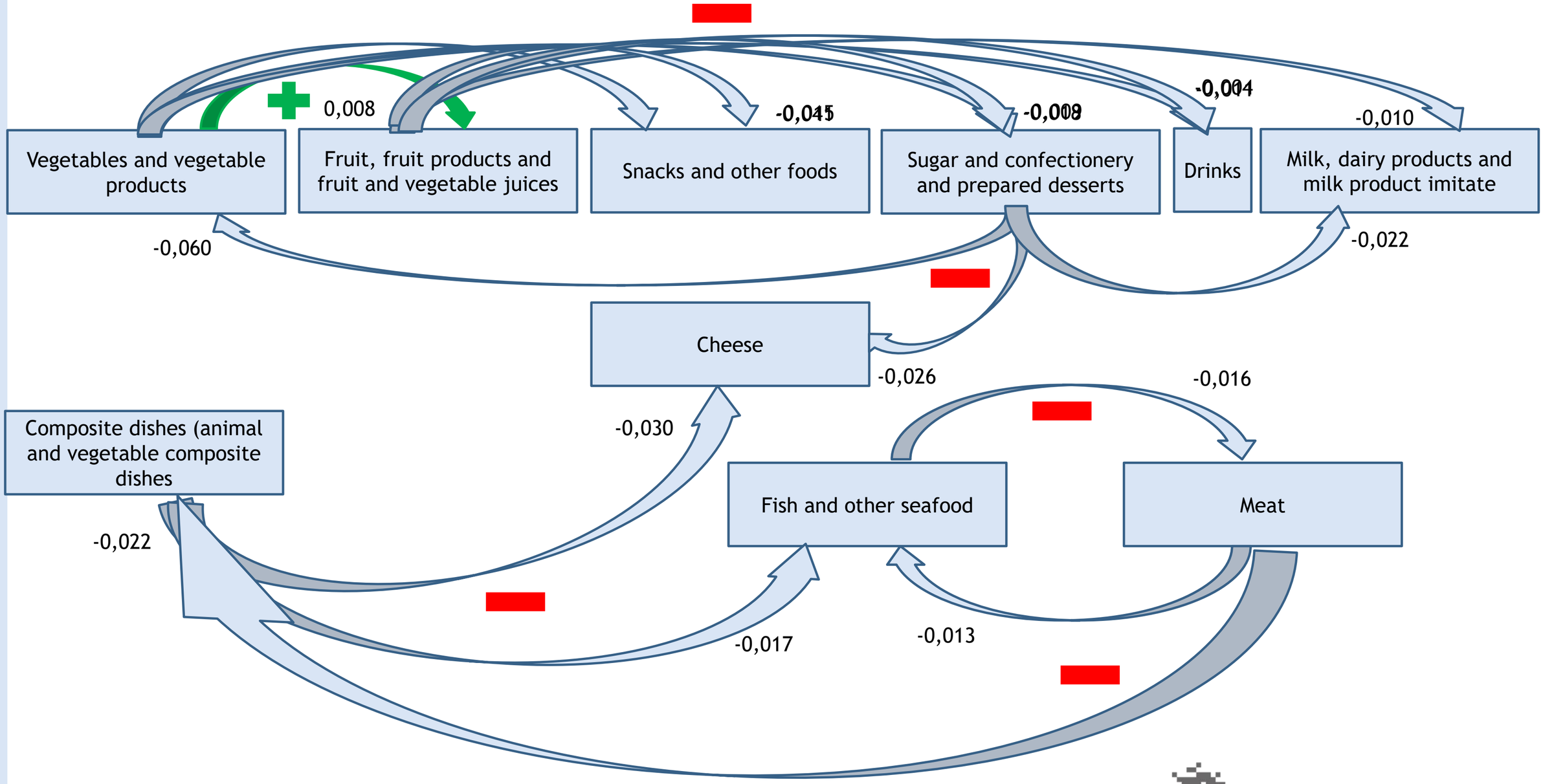


- Grains and grain-based products
- Starchy roots, tubers Legumes, nuts and oilseeds
- Meat
- Milk, dairy products and milk product imitates
- Sugar and confectionery and prepared desserts
- Vegetables and vegetable products
- Fruit, fruit products and fruit and vegetable juices
- Fish and other seafood
- Cheese
- Composite dishes (animal and vegetable)

Promotion elasticities



Research results Cross-promotion elasticities



Section VI

Conclusions

Conclusion & Discussions

- Price **have** positive effect **on household expenditures** indicating that the **demand** for the created food categories is inelastic and households are not price sensitive

- Promotion induces an increase in household expenditures.

-The effects of promotions are heterogeneous across food categories

-Strongest effects have been found on 'Fish and other seafood', 'Composite dishes', 'Fruits, fruit products and vegetable juices', 'Sugar and confectionery and prepared desserts' and 'Drinks' expenditure

- Own-promotion effects were stronger than the cross-effects. Moreover, cross-promotion effects were negative

- Cross-effects are asymmetric between related categories

- Retailer managers should focus on promoting categories such as 'Fish and other seafood", 'Composite dishes', 'Fruits, fruit products and vegetable juices', 'Sugar and confectionery and prepared desserts' and 'Drinks' being cautious with the cross-effects

- From a health perspective, the results indicate that promotions on healthier food categories like 'Fruit, fruit products and fruit and vegetable juices' or 'Vegetables and vegetable products' have a negative effect on 'Snacks and other food', 'Sugar and confectionery and prepared desserts' and 'Drinks'. But the reverse effect is also present.

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Thank you for listening

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