Voluntary Front-of-Pack Labelling and Customer Reviews

Francesca Chiaradia

University of St Andrews

12-13 January 2023
SGPE Conference 2023

Outline

Voluntary Front-of-Pack Labelling in the UK

Multiple Traffic Light System:
At-a-glance information on pre-packed foods about high (red), medium (amber), or low (green) content of fat, saturates, sugars, and salt.
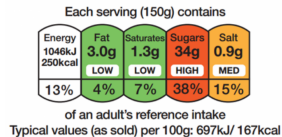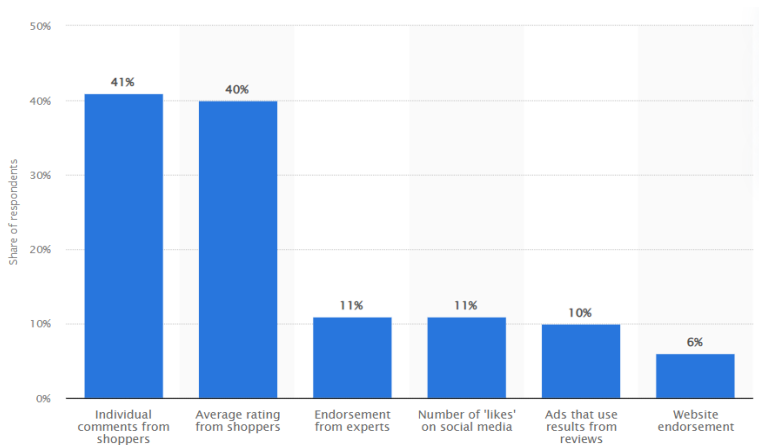

Figure 1: Multiple Traffic Light Labelling.

Source: Google Trends (2022).

Figure 2: Google Trends on "front-of-pack labelling" (2017-2022).

Why Online Grocery Reviews?

Source: Statista Research Department (2016).

Figure 3: Influence of different types of product reviews when grocery shopping online in the UK (2016).

Research Questions

1. Can online reviews and ratings help consumers predict nutritional quality?
   - For a subset of online grocery products;
   - From the buyer viewpoint.
2. If e-grocery product reviews do not convey messages compatible with front-of-pack labelling, how can governments regulate this space more effectively?
   - Optimality $\neq$ equilibrium.

Policy Implications

Data

- **Online Product Data:**
  - Tesco is UK's largest grocery retailer with 38% of market share in the digital channel;
  - Hand-collect and digitise FOPNL data from a sample of 5000 products across four categories:
    1. Fresh Food;
    2. Bakery;
    3. Frozen Food;
    4. Food Cupboard;
  - For foods without MTL, I fill missing FOPNL data using the McCance and Widdowson's 'composition of foods integrated dataset' and the EFSA Comprehensive European Food Consumption Database.

Data

- **Customer Reviews / Ratings:**
    - To extract customer data, I scrape product reviews and ratings for the same sample;
    - Integrate this information with FOPNL data;

- **Scanner Data:**
    - Track Tesco Clubcard members' online purchases and link them to individual characteristics.

Empirical Framework

STAGE I:

1. **Embedding** $\rightarrow$ transform customer reviews into a numerical vector representation:
   - Use Word2Vec algorithm: semantically similar words are close together;
   - Obtain a document term matrix with reviews extracted from different foods.

2. **Clustering** $\rightarrow$ exploit internal similarity and external uniqueness:
   - Apply Singular Value Decomposition (SVD) to group products with similar reviews into taste clusters based on their nutritional content;
   - Use this representation to obtain information about potential markets.

STAGE II:

- ⓾ **Simulation**: $\rightarrow$ train a (deep reinforcement learning) agent to recognise different clusters:
    - Combine this information with scanner-level data to train and observe how simulated agents behave;
    - How do RL agents best respond to humans?

Related Literature

- **Use of Natural Language Processing (NLP) to extract customer information**
  - Kang *et al.* (2013), Decarolis and Rovigatti (2021), Katumullage *et al.* (2022);
  - ⋆ Different context: exploit text data to analyse voluntary food labelling policy.

- **Role of pre-purchase information on digital platforms**
  - Lewis and Zervas (2016), Farronato *et al.* (2020), Liu, Ranjan and Shiller (2020);

- **Customer responses to different FOPNL systems**
  - Kiesel and Villas-Boas (2013), Barahona *et al.* (2021, 2022);
  - ⋆ No causal effect: use FOPNL information as a prediction policy tool.

Summary

- Do not establish causality or quantify the effect of e-ratings on the FOPL system.

   Can existing communication channels achieve optimal persuasion?

   1. Do online grocery ratings and reviews offer predictive cues to improve nutritional choices?
   2. How could planners preemptively regulate the online space to improve the effectiveness of the FOPNL system?

Limitations

Strong assumption:

- Consumers have **homogeneous preferences** for health.

Other assumptions:

- Online grocery platform and firms respect the **boundaries** imposed by the regulator;
- User-generated reviews and ratings disclose **truthful information** about consumers' beliefs.

Policy Implications

- In 2020, the UK Government launched a **public consultation** on the current FOPNL system
- In the European Union, a proposal for a **harmonized mandatory FOPNL** was put forward as part of the European Green Deal

Is the FOPNL system still effective in the presence of pre-purchase information?

References

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Thank you!

https://francescachiaradia.com

fc73@st-andrews.ac.uk