DEMAND UNCERTAINTY AND SKEWNESS IN PRODUCT INNOVATION

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INTRODUCTION

Research Question

Does demand uncertainty tilt product innovation to inelastic consumers? Does this have implications for the transmission of nominal shocks to inflation?

The mechanism

▶ Demand uncertainty upon launches forces firms to learn via price changes.

▶ The more elastic consumers are the costlier learning

▶ Firms have incentive to launch products targeted to more inelastic consumers.

▶ Implications for aggregate shocks and innovation.

Results

▶ Merge consumption survey with scanner data on product level

▶ New product increasingly associated with higher-income consumers.

▶ Variances of prices in then first year depend on main consumer group

THE LITERATURE

Product Life Cycle and Macroeconomics

Argente et al. (2024), Argente and Yeh (2022)

Demand Composition

Nord (2024), Sangani (2023), Kaplan et al. (2019), Kaplan and Menzio (2016)

Aggregate Shocks and Innovation

Ma and Zimmermann (2023), Jorda et al. (2020), Moran and Queralto (2018)

THE DATA

1) Generated by Point-of-Sale systems in retail stores
2) Week x Store x Product
3) Prices (weekly unit values), Quantities sold, Product Information, Store Information
4) From 2013 to 2022
5) Fast moving consumer goods like food, beverages, personal care, household care (COICOPs: 11, 12, 21, 52, 56, 61, 93, 121)
6) Covers more than 20% of all purchases in these COICOP categories p.a.

THE DATA
HOUSEHOLD SCANNER DATA

1) Reported by consumers after each shopping trip
2) Observation: Transaction date x Store x Product x Buyer
3) Additional information:
   - **Transactions**: Prices (transaction unit values), Quantities
   - **Barcodes**: Product description, category, manufacturer, brand, private label flag
   - **Customers**: annual demographic characteristics
   - **Stores**: shop type, region, zip code
4) From 2008 to 2022

Product = Barcode

Cool:

- ▶ Every barcode is unique at any given time
- ▶ Changes in attributes lead to new barcode (mostly)
- ▶ Barcodes are cheap and benefical to seller (high incentives to use them)
- ▶ No ex-ante discrimination in nature of new products
- ▶ First transaction with barcode clear indicator of novelty
- ▶ We define new as in "one year after first appearance"

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But:

- ▶ The same barcode can have multiple products over time (recycling of barcodes)
  - $\implies$ Makes continuous swap undetectable
- ▶ New vs. "New" Product

Steps Taken

Left censoring for 2013

Adjust price by volume: e.g., "euro per 100 gram"
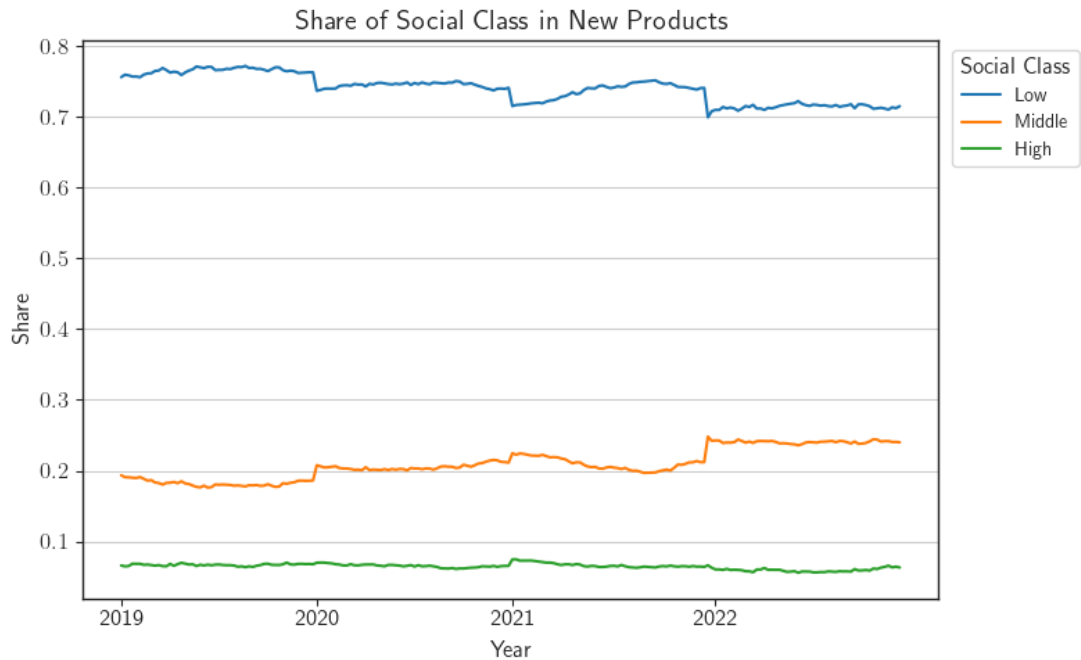
Drop products with no metric measurement units

After merging both dataset, we have...

► 2.16 billion observations of 54688 new products (8% of sample)

► 6886 stores operated by 23 retailers across all France
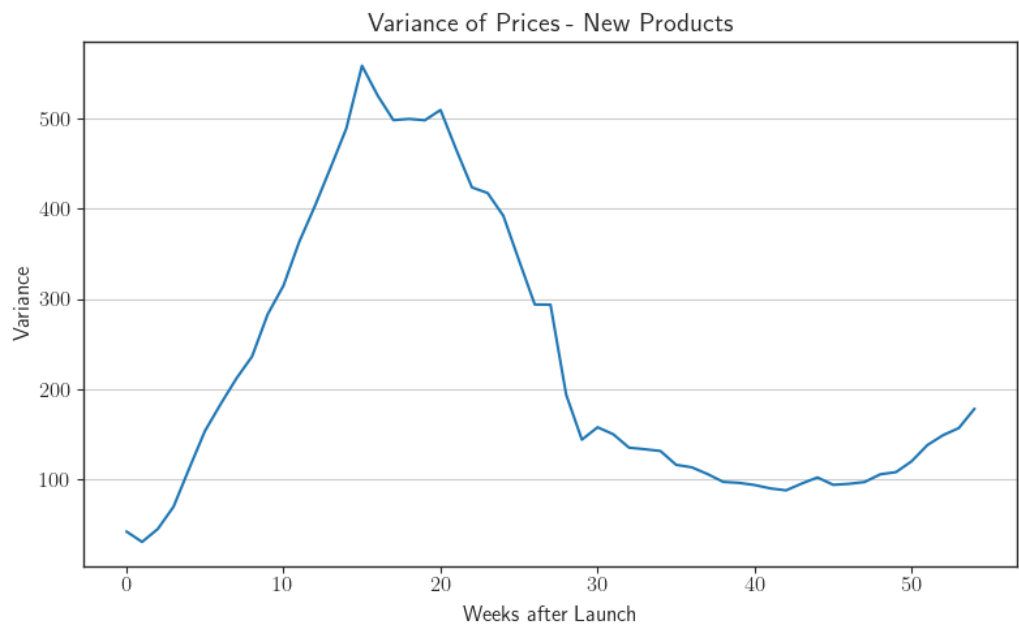
► For 2019 to 2022

STYLIZED FACTS

COMPOSITION OF NEW PRODUCTS: NEW PRODUCTS ARE "NOT FOR THE POOR"

Figure. Composition of New Products by Consumer
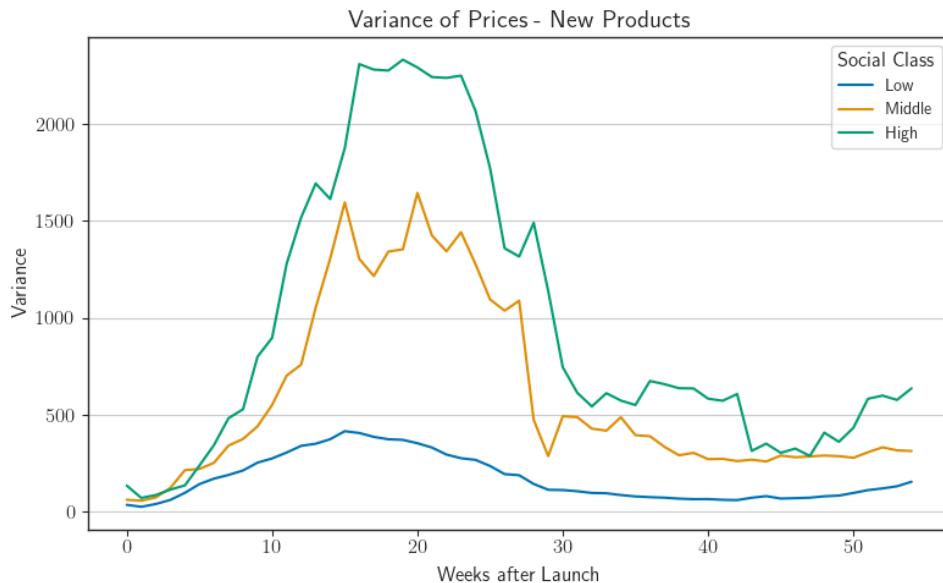
STYLIZED FACTS

VARIANCE OF PRICE OF NEW PRODUCTS PEAKS ABOUT 14 WEEKS AFTER LAUNCH

Figure. Variance of the Life Cycle

STYLIZED FACTS

VARIANCE OF PRICES OF NEW PRODUCTS HIGHER FOR HIGHER SOCIAL CLASSES

Figure. Variance of the Life Cycle by Social Class
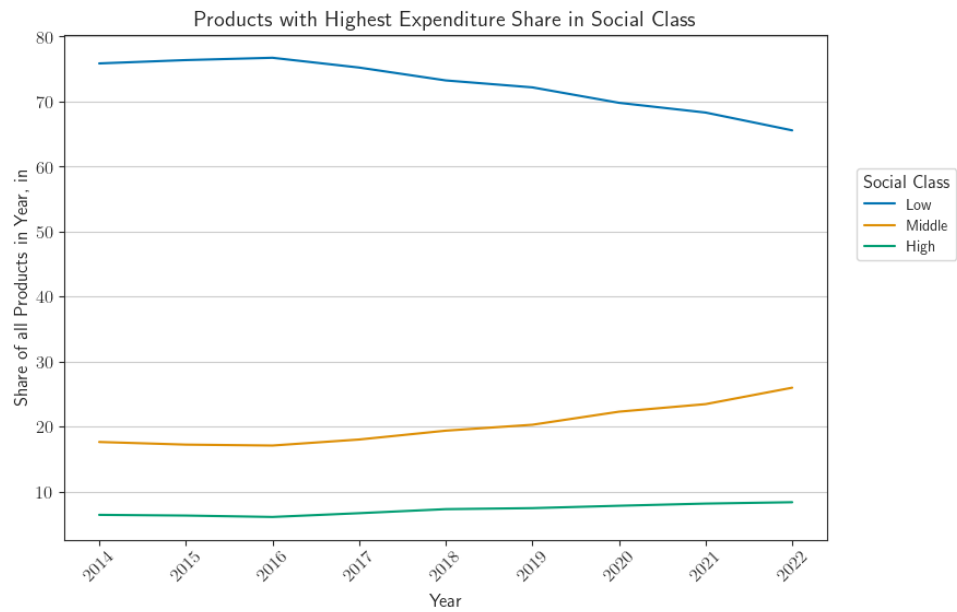
Price Dispersion Launch   Bootstrapping

THE FUTURE

► **Data analysis and robustness of stylised facts to thresholds and definitions**
  - Maximum share for definition?
  - Ex-ante definition of Type (maybe compare against distribution of prices before)
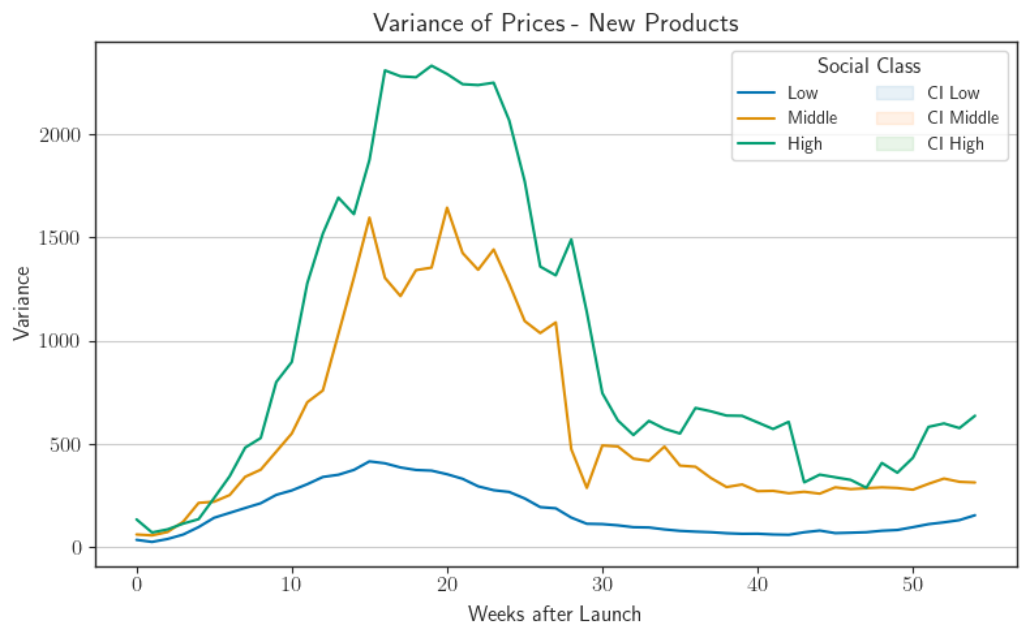 - Survival Function of New Products by Type

► **Model**
  - Think of model of product innovation choice when demand elasticity is heterogeneous across customer groups
  - Necessary to derive implications of demand heterogeneity for pass-through of costs shocks
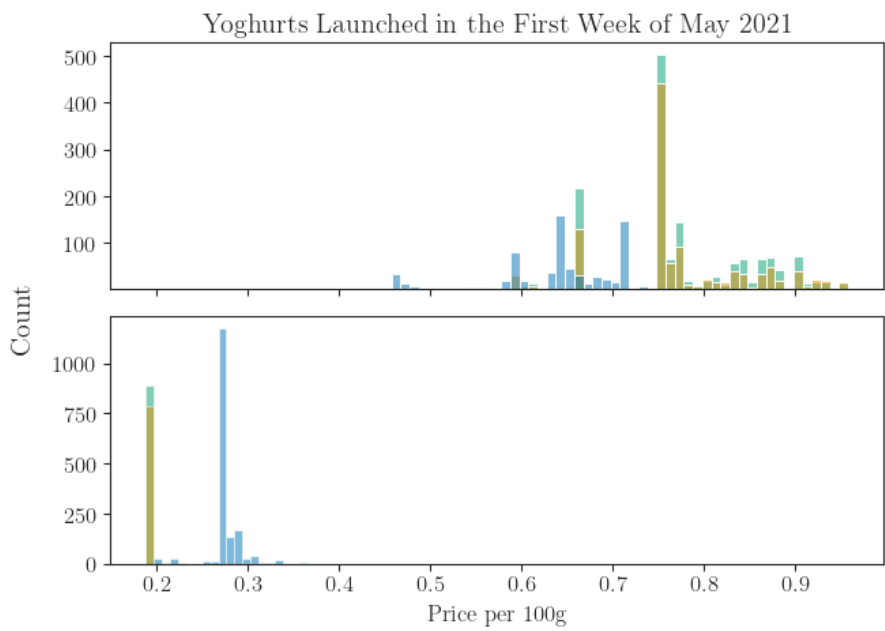
APPENDIX

Products with Highest Expenditure Share in Social Class

Figure. Clustered Bootstrap

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Figure. Price Dispersion Upon Launch for Yoghurts