Does Shopping behavior impact Food Waste?  
(Online Vs Offline grocery shopping)

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Motivation

- In US, households waste around 617-661 lbs in a year (contributes 60% of total food waste)[1]  
- Households waste 150,000 tons food daily.  
- Equivalent to one-third of daily calorie consumed by average American.  
- The cost of food wasted[2] per year corresponds to  
  yearly use of 30 million acre of land.  
  4.2 trillion gallons of water  
  billions of pounds of fertilizers  
- Households wasted 41% of meat, poultry and fish, 14% of dairy products, 17% of vegetables and 9% of fruits.  
- Households waste almost 25% of the products purchased.  
- Inability to match the purchases with consumption habits.  
- Inability to stick to a shopping list.  
- Impulse buying  
- The extent of these above behavior depends upon household’s shopping mode: Offline or Online[3]

Background

- Why households waste food?  
  - Confusion over date labels, Poor storage facilities, Impulse and bulk buying, Poor planning  
  - We focus on grocery shopping behavior across online and offline channels.

- Current trends in online grocery sales:  
  - constitute 20% of market by 2025
  - 43% of millennials shop grocery online in 2017
  - 2017, Amazon acquired Whole Foods
  - Increasing number of companies: Amazon Fresh, Fresh Direct, Net Grower, Walmart, Kroger, Safeway.

- Research Objectives & Data

  - Empirically calculates the magnitude of food waste across online, offline and mixed shoppers.
  - Intends to analyze the economic impact of food waste resulting from online, offline and mixed channels.

- Data:
  - Scanner data from June 2004 to 2006
  - Consider category of mainstream milk
  - Includes online and offline purchases
  - Delivery fee: $0, $4.45, $7.95, $9.95.
  - Minimum basket restrictions included
  - 929 households: 144 (online shoppers), 270 (offline shoppers), 515 (mixed – online and offline shoppers)
  - Demographic variables of households from census tracts using store location as addresses

Methodology

- The empirical model focuses on purchase behavior of households.
- The purchase behavior include two decisions[4]: (1) When to buy? (2) How much to buy?  
- The first stage captures the timing of purchase and second stage captures the purchase quantity.
- The variable of interest is the average consumption rate for a sample period for online, offline and mixed shoppers.
- The avg. consumption rate is controlled for demographic attributes of households using census tracts data.
- The difference between the average consumption rate for each shopper group and observed weekly purchases approximates to the magnitude of food waste.
- This model is expected to capture the inventory behavior of households using different shopping channels.

Expected Results

- Online shoppers - follow pre-planned schedule but buy in bulk due to basket restrictions.  
  - A subscription model where there is delivery fee and basket restrictions: food waste may be lower
  - A delivery model, to avoid delivery fee, shopper may buy more than required – higher food waste
  - Offline shoppers - have higher food waste because of poor planning and high travel cost.
  - Mixed shoppers - lowest food waste as they chose when to buy and how much to buy depending on their need and channel to use.

References