Food Access, Eating Habits and Adult Obesity in Italy
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The Obesity Epidemic – Italy
- The WHO defines obesity and overweight as abnormal or excessive fat accumulation that may impair health. The Body Mass Index (BMI: weight in Kg/height in m²) is commonly used to classify adult individuals as: Normal Weight (20<BMI<25) - Overweight (25<BMI<30) - Obese (BMI>30).
- Adult obesity has reached worrisome levels across the globe with incidence >30% in the U.S.; in some European Countries the share of overweight and obese adult population has reached 50% (WHO).
- In Italy the official adult obesity rate is close to 10%, below the OECD average (16%).
- This figure seems underestimated (Hansstein et al., 2009); epidemiology studies evaluates adult obesity incidence in Italy at 25% (Berghöfer, 2008).
- The direct obesity cost in Italy are € 4.7 billion, the third highest in the EU (Fry and Finley, 2005).

Obesity and the Food Environment
- In 2007, the WHO highlighted the importance of promoting macroeconomic policies against the obesity epidemic to improve food availability and access.
- Disparity in food stores’ availability influences people’s diets. Consumers may adopt better (worse) diets if they have access to outlets that sell a larger variety of healthy (unhealthy) food (Morland et al. 2006; Hawkes, 2008).
- Does disparity in food access justifies the geographical differences in incidence of overweight and obese among the Italian population?
- Northern Italy shows a higher number of large food stores (almost twice as large) than the South, where instead there is a large concentration of fruit and vegetables stores.

Research Objectives
- Measure the impact of food outlets’ density on adult’s BMI in Italy.
- Assess synergies between consumers’ eating habits and food access.

Model Specifications
Following Courtemanche and Carden (2011):

\[ BMI = \beta_0 + \sum \beta_1 SE + \sum \beta_2 F + \sum \beta_3 EH + \sum \beta_4 A + e \]  

Where:
- SE: consumers’ socio-economic characteristics (household size, age, gender, income, etc.);
- F: behavioral variables (smoking, practice of physical activities, time spent watching TV);
- FA: variables capturing access to alternative food stores;
- A: regional fixed effect.

To synergetic role of EH and FA on BMI is captured via the specification:

\[ BMI = \beta_0 + \sum \beta_1 SE + \sum \beta_2 F + \sum \beta_3 EH + \sum \beta_4 A + e \]  

Data Sources
- Multipurpose Household Survey (MHS) year 2007. Cross-sectional database of individual/household characteristics, adults (age>18) [N=21,511].
- Eating habits: frequency of consumption for 15 food and beverage categories from the MHS; reduced to 4 via PCA, then rescaled to binary indicators:
  - alcoholic beverages (beer, wine, amaro, liquors),
  - fruit and vegetables (fruit, vegetables, leafy vegetables),
  - junk food (salted snacks, sweats, carbonated soft drinks),
  - protein-rich food (meats, dairy, eggs, fish, and cold cuts).

Food Access variables – Regional aggregates (N stores/Population)
1) Hypermarkets and supermarkets - LOD [(G4711+G4712) / Pop*100,000]
2) Minimarkets and peddler - LOS [(G4781+G472 - G4721) / Pop*100,000]
3) Restaurants, fast food restaurants and pubs – FSS [I5610/Pop*10,000]
4) Bakeries – BA [C1A071/Pop*10,000]
5) Fruit and vegetable stores - FVS [G4721/Pop*100,000] (Sources: 3, 4) and 5) National Institute of Statistics - Unità economica dell’industria e del servizi; 1, 2) Osservatorio Nazionale Del Commercio (ATECO 2007 industry codes).

Identification Strategy and Estimation
- Store location is an equilibrium outcome: food stores density endogenous.
- Tests for spurious correlation and IV methods (GMM) necessary.

Instruments chosen are aggregate market-level measures impacting store’s location decision: Highways (Km/1000Km²), % of land in public parks and gardens; number bus/1000 people; density of coasts (Km/Km²); secondary roads density (Km/1000Km²); crime rate (theft and robbery); population density (People/1000Km²).

Data manipulation and estimation performed in STATA v.10

Empirical Results
- Results consistent with previous literature; show similar magnitude and significance across specifications.
- Food outlets’ density has a positive impact on BMI; frequent consumption of fruits and vegetables and protein more than the average mitigates their beneficial impact on BMI.

Hansen J p-value
0.037
0.024

Disparity in food stores’ availability influences people’s diets. Consumers may adopt better (worse) diets if they have access to outlets that sell a larger variety of healthy (unhealthy) food (Morland et al. 2006; Hawkes, 2008).

Does disparity in food access justifies the geographical differences in incidence of overweight and obese among the Italian population?

Northern Italy shows a higher number of large food stores (almost twice as large) than the South, where instead there is a large concentration of fruit and vegetables stores.

unclear patterns!!! Could other factors (i.e. eating habits) play a role?

Empirical Results

Empirical Results - FA & EH

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<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
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<tbody>
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Note: *, ** and *** are 10, 5 and 1% significance levels - Standard errors in parenthesis

Empirical Results-Eq.3: Marginal Effects of FA on BMI conditional on EH

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Conclusions
- Results confirm a causal relationship between different food outlets’ density and adult BMI in Italy;
- Synergic effects of food access and eating habits on adult BMI emerge;
- Policy implications: policymakers may consider adopting an integrated approach to fight obesity, creating measures to improve the quality of the food environments.