



Time in Eating and Food Preparation among Single Adults

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Research Objectives

General goal: better understand food choices today

Specific objectives:

1. Ascertain the role of different factors in **eating time** and **food preparation time** among single adults
2. Develop empirical framework to **jointly** study durations of five eating and food preparation activities
3. Investigate impact of **food environment**—*food prices* and *food establishment densities*—on eating and food preparation time

Motivation

Big changes in eating and food preparation patterns

- Shift away from primary eating toward secondary eating
- Growing importance of eating away from home
- Decline in food preparation time

Health implications of changing time allocation

- Less control over food intake during secondary eating
- Lower nutritional quality of foods away from home
- Food preparation time is linked to nutritional content of meals

Public policy relevance

- Food assistance programs focus on financial resources, ignore time
- But time constraints affect expenditures needed for adequate diet
- Public policy can influence time use through food environment

Novelty and Contribution

Relative to previous studies (e.g., Hamermesh 2007; 2010), we more accurately account for increasingly complex nature of eating

We develop an empirical model to **jointly** explain durations of:

- 1) Primary eating at home
- 2) Primary eating away from home
- 3) Secondary eating at home
- 4) Secondary eating away from home
- 5) Food preparation

We investigate eating time jointly with food preparation time; we allow for correlation in error terms across model equations

We incorporate food prices and food store/outlet availability measures

Empirical analysis is based on nationally representative data

Theoretical Model I

We focus on adults from single decision-maker households

We adopt Becker's (1965) **household production approach**

$$\max U(FH, FA, Z, L; \tau)$$

FH : food commodity related to eating at home

FA : food commodity related to eating away from home

Z : composite commodity; L : leisure time; τ : individual characteristics

Food commodity **production functions**:

$$FH = F(XH, PH, SH, R; \mu_1)$$

$$FA = G(XA, PA, SA; \mu_2)$$

XH and XA : market good inputs; R : duration of food preparation

PH and PA : durations of primary eating at home and away from home

SH and SA : durations of secondary eating at home and away from home

μ_1 and μ_2 : individual characteristics affecting production efficiency

Theoretical Model II

Primary time-use constraint: $H + L + PH + PA + R = T$

Secondary eating time constraint: $SH + SA \leq H + L + R$

Budget constraint: $P_{XH} \cdot XH + P_{XA} \cdot XA + Z = W \cdot H + V$

H : work time; T : time endowment; P_{XH} and P_{XA} : prices of market goods;
 W : wage rate; V : non-labor income

Durations of eating and food preparation are determined by solution to constrained utility maximization problem:

$$PH^* = PH(P_{XA}, P_{XH}, W, V, \tau, \mu_1, \mu_2)$$

$$PA^* = PA(P_{XA}, P_{XH}, W, V, \tau, \mu_1, \mu_2)$$

$$SH^* = SH(P_{XA}, P_{XH}, W, V, \tau, \mu_1, \mu_2)$$

$$SA^* = SA(P_{XA}, P_{XH}, W, V, \tau, \mu_1, \mu_2)$$

$$R^* = R(P_{XA}, P_{XH}, W, V, \tau, \mu_1, \mu_2)$$

Data

- **American Time Use Survey (ATUS)** matched with ATUS's **Eating and Health Module** (years 2006, 2007, 2008)
 - Respondents report type of activity, location, duration (in minutes) for 24-hour period corresponding to previous day
 - Matched to CPS for additional data, geographical identifiers
- Food price data and food business establishment data
 - Quarterly Food-at-Home Price Database (**QFAHPD**, *source*: ERS)
 - **ACCRA** (*source*: Council for Community and Economic Research)
 - County Business Patterns (**CBP**, *source*: Census Bureau)
- Sample: adults from single decision-maker households
 - Pool 3 years of data: 2006, 2007, 2008; data quality check
 - **N=11,070**

Selected Sample Characteristics

| Variable | Mean | SE |
|--------------------------------------|-------------|-----------|
| Socioeconomic characteristics | | |
| Age, years | 52.21 | 0.240 |
| Male | 0.42 | 0.006 |
| Female | 0.58 | 0.006 |
| White | 0.78 | 0.005 |
| Black | 0.18 | 0.005 |
| Other race | 0.04 | 0.002 |
| Hispanic | 0.08 | 0.003 |
| US-born | 0.91 | 0.004 |
| Log of real family income | 8.53 | 0.047 |
| Income <130% poverty | 0.26 | 0.005 |
| Income 130–185% poverty | 0.13 | 0.004 |
| Presence of children | | |
| Ages 0–5 | 0.05 | 0.002 |
| Ages 6–15 | 0.10 | 0.003 |

Statistics for Dependent Variables

| | Primary Eating | | Secondary Eating | | Food Prep |
|-------------------------------------|----------------|----------------|------------------|----------------|----------------|
| | At Home | Away from Home | At Home | Away from Home | |
| Full sample | 36.9 (0.47) | 28.8 (0.54) | 29.3 (1.08) | 29.8 (1.20) | 38.8 (0.64) |
| Fraction of cases with zero minutes | 22.4% | 52.0% | 64.7% | 69.3% | 38.1% |
| Gender | | | | | |
| Male | 33.3 (0.76) | 33.1 (0.88) | 26.9 (1.46) | 31.2 (2.08) | 29.1 (0.79) |
| Female | 39.4 (0.57) | 25.7 (0.68) | 30.9 (1.49) | 28.8 (1.57) | 45.7 (0.92) |

Means (in **minutes/day**) and standard errors (in parentheses)

Estimation Approach

- We model duration of each activity using **Tobit** approach
 - Activity duration is non-negative
 - Substantial fraction of cases with zero time in activity
- We estimate **SUR** system of Tobit equations
 - All 5 food-related activity equations are estimated **jointly** by ML
 - We allow for correlations across equation error terms
- To interpret results, we calculate **average marginal effects**

$$\frac{1}{n} \sum_{i=1}^n \frac{\partial}{\partial x_i} E[y_{ij} | x_i, \hat{\theta}_{MLE}]$$

- i : individual; x_i : explanatory variables for i ; y_{ij} : i 's time in activity j
- AME measures effect of unit change in explanatory variable on expected duration of food-related activity in minutes/day

Selected Average Marginal Effects I

| | Time in Eating | | | | |
|----------------------------|--------------------|---------------------|----------------------|--------------------|---------------------|
| | Primary at Home | Primary AFH | Secondary at Home | Secondary AFH | Food Prep |
| Age | 0.64*** (0.02) | -0.35*** (0.03) | 0.15*** (0.05) | -0.92*** (0.05) | 0.55*** (0.03) |
| Male | -0.28 (0.75) | 2.47*** (0.84) | -7.45*** (1.57) | -4.56*** (1.40) | -10.67*** (1.09) |
| Hispanic | -3.91*** (1.36) | 1.14 (1.45) | -12.90*** (2.90) | -7.59*** (2.55) | 1.94 (1.98) |
| Foreign born | 4.45*** (1.29) | 1.00 (1.42) | -9.39*** (2.81) | -6.82*** (2.45) | 6.36*** (1.97) |
| Child age 0–5 | 2.66* (1.41) | -2.35 (1.65) | 0.34 (3.06) | -3.99 (2.63) | 15.02*** (2.10) |
| Child age 6–15 | 4.28*** (1.05) | -4.94*** (1.16) | 5.64*** (2.07) | 0.57 (1.93) | 17.69*** (1.51) |
| Income <130% poverty | 5.42*** (1.04) | -12.05*** (1.20) | 2.86 (2.11) | -8.27*** (1.97) | 5.40*** (1.41) |
| Income 130–185% poverty | 2.70** (1.13) | -3.12** (1.26) | 1.57 (2.27) | -4.60* (2.14) | 2.96* (1.62) |
| Log of real income | -2.37*** (0.56) | 3.24*** (0.63) | -1.80 (1.11) | 5.16*** (1.03) | -1.30* (0.77) |

Selected Average Marginal Effects II

| | Time in Eating | | | | Food Prep |
|----------------------|-------------------|-------------------|--------------------|---------------------|--------------------|
| | Primary at Home | Primary AFH | Secondary at Home | Secondary AFH | |
| HS degree | 2.11* (1.15) | 3.71*** (1.41) | 5.47** (2.53) | 7.87*** (2.47) | -0.92 (1.75) |
| Some college | 2.49** (1.22) | 5.24*** (1.48) | 8.19*** (2.67) | 10.91*** (2.56) | -0.30 (1.80) |
| Bachelor's or higher | 4.86*** (1.31) | 6.44*** (1.56) | 11.33*** (2.79) | 16.00*** (2.69) | -0.35 (1.94) |
| Holiday | -1.32 (2.99) | 5.17 (3.40) | 2.98 (5.87) | -6.50 (5.34) | 10.34** (4.63) |
| Sunday | 0.68 (1.20) | -2.69* (1.41) | 10.32*** (2.60) | -13.81*** (2.37) | 2.38 (1.79) |
| Friday | -2.67* (1.41) | 3.01* (1.59) | 3.28 (3.17) | 2.15 (2.74) | -3.57* (2.05) |
| Saturday | -1.15 (1.17) | 0.32 (1.40) | 7.23*** (2.56) | -1.12 (2.32) | 3.53** (1.78) |
| QFAHPD index | 40.69 (42.93) | -7.18 (52.41) | -106.33 (90.30) | 151.65* (84.75) | 112.24* (64.46) |

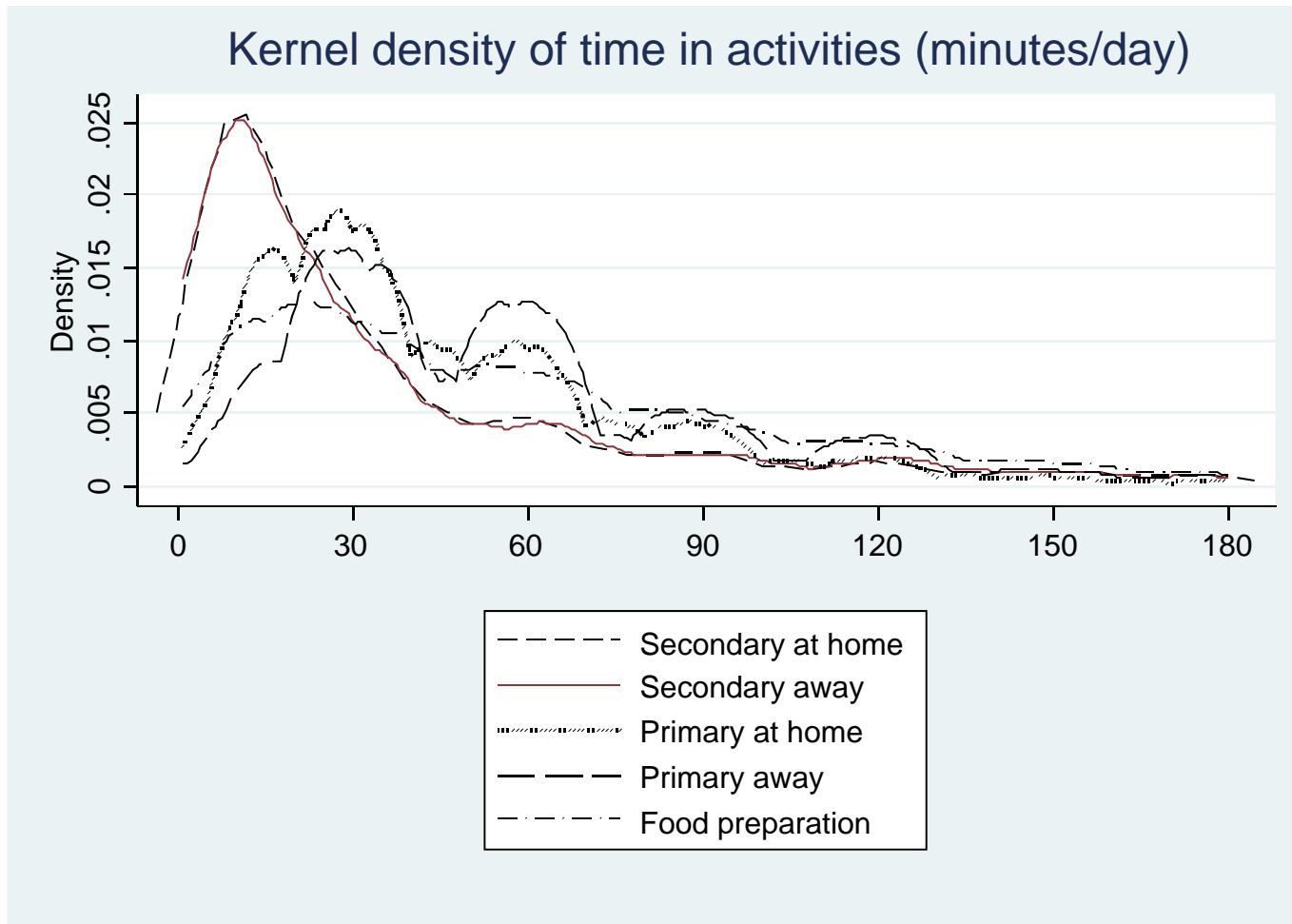
Conclusions

- Key findings
 - Mean duration of each food-related activity is ~30 min/day
 - Low-income adults spend more time in eating at home, less time in eating away from home, more time in food preparation
 - Children are associated with more time in eating at home, less time in eating away from home, more time in food preparation
- Policy relevance
 - Time constraints faced by low-income single adults with children can be a limiting factor in achieving healthier diets
 - Changes in public policies affecting food prices (e.g., taxes or subsidies) can impact food-related time use
- Implications and future research directions
 - Need to better understand consequences of differences in food-related time-use patterns for dietary intake, energy balance, health
 - Growing importance of secondary eating should be recognized



Thank you! Questions?

Appendix: Kernel Density Estimates



Appendix: Food Price Indices

Food-at-home price index:

- Based on **QFAHPD** price data in \$/100g
- Expenditure-weighted average of 50+ food group prices (real \$)
- Location- and time-specific: by market area and year-quarter

Fast food price index:

- Based on individual food item prices in **ACCRA** database
- Average of prices of three fast food items (real \$)
- Same as fast food price index of Chou et al. (2004), Powell (2009): Location- and time-specific: by metropolitan area and year-quarter
- Merged with sample records using geocodes

Appendix: Food Outlet Densities

Main source: County Business Patterns (**CBP**) database

Businesses are classified using 6-digit NAICS code

We create densities—number of establishments per 10,000 local residents—for 5 groups of establishments:

- **Supermarkets** and other general line grocery stores
- **Convenience stores**
- **Specialty food stores**
 - Meat markets; fish and seafood markets; fruit and vegetable markets; baked goods stores; confectionery and nut stores; all other specialty food stores; retail bakeries
- **Full-service restaurants**
- **Limited-service eating places**