



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 role of different factors in **eating time** and **food preparation time**
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/caloric 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 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 unobservables across model equations

We incorporate food prices and food store/outlet availability measures

Empirical analysis is based on recent, 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
U.S.-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} : time of i in activity j
- AME quantifies 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)

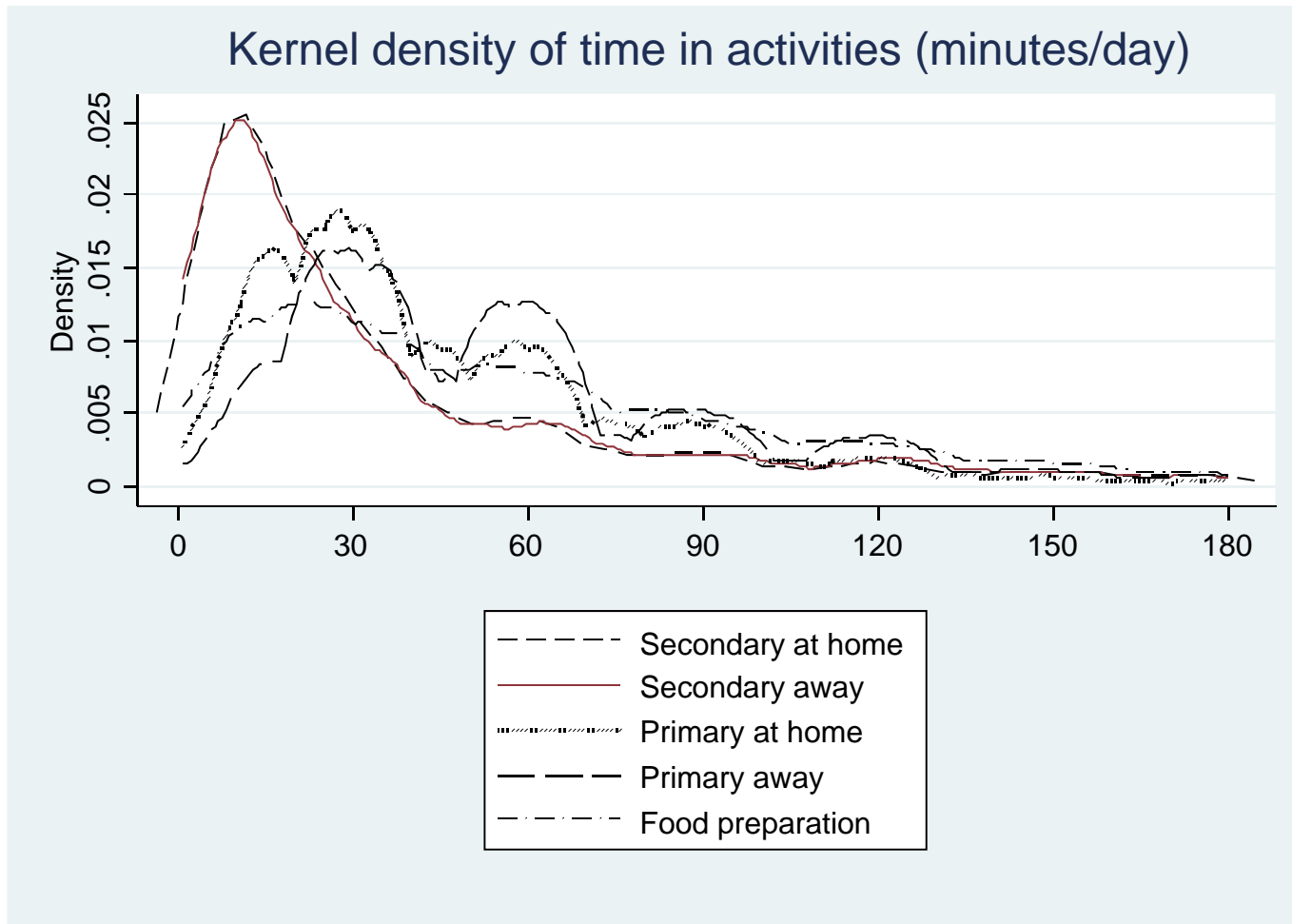
Conclusions

- 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**