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. Identify the effects of food prices on **eating time** and **food preparation time** among single adults
2. Ascertain the role of other factors including socioeconomic variables on **eating time** and **food preparation time** among single adults
3. Develop an empirical framework to account for the choices over durations of eating and food preparation activities

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 and 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, discount time input
- Time input is related to expenditures needed for an adequate and varied diet
- Public policy can influence time use through food prices

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 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 along with food preparation time

We incorporate prices for food-at-home and fast food

Empirical analysis is based on a large, nationally representative dataset

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

Solution to the utility maximization problem determines durations of eating and food preparation:

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

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 (e.g., detailed geographical identifiers)
- Food price data
  - Quarterly Food-at-Home Price Database (**QFAHPD**, *source:* ERS)
  - **ACCRA** (*source*: Council for Community and Economic Research)
- Sample: adults from single decision-maker households
  - Pool 3 years of data: 2006, 2007, 2008; data quality check
  - ***N* = 11,070**

Selected Summary Statistics

Variable	Mean	SE
Food prices in 1982 dollars		
Food-at-home price measure	0.24	0.0002
Fast food price measure	2.63	0.002
Socioeconomic characteristics		
Age, years	52.21	0.240
Male	0.42	0.006
White	0.78	0.005
Black	0.18	0.005
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
Indicators for 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		
	At Home	Away from Home	At Home	Away from Home	Food Prep
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 a **double-hurdle** approach:
  - Cases with zero time in an activity are accounted for
  - Activity durations must be non-negative
  - The approach is more flexible than a Tobit approach
- Parameters are estimated by maximum likelihood. To interpret the results, we calculate **average marginal effects (AME)** for:

  (1) Probability of a positive activity duration:

$$\frac{1}{n}\sum_{i=1}^{n}\frac{\partial}{\partial x_i}\Pr\left[y_{ij} > 0 \middle| x_i\right]$$

  (2) Expected activity duration:

$$\frac{1}{n}\sum_{i=1}^{n}\frac{\partial}{\partial x_i}\mathrm{E}\left[y_{ij} \middle| x_i\right]$$

  Here, i: individual, x_i: explanatory variables for i, y_{ij}: i's time in activity j

- In estimation, we control for region, year, and season fixed effects

Selected Average Marginal Effects on Duration of Eating & Food Preparation I

	Time in Eating				
	Primary at Home	Primary AFH	Secondary at Home	Secondary AFH	Food Prep
Food-at-home price	**66.90****	**55.61**	**-75.51**	**38.56**	**85.62*****
	(29.28)	(37.10)	(59.74)	(48.22)	(27.25)
Fast food price	**-3.83***	**-2.54**	**1.33**	**4.07**	**6.68***
	(2.06)	(2.73)	(5.16)	(4.99)	(3.84)
Age	**0.66*****	**-0.28*****	**0.14****	**-0.75*****	**0.53*****
	(0.03)	(0.04)	(0.07)	(0.07)	(0.04)
Male	**0.29**	**2.70*****	**-1.16**	**-1.80**	**-10.58*****
	(0.80)	(0.96)	(1.89)	(1.66)	(1.24)
Child, age 0–5	**2.43**	**-3.46****	**-1.49**	**-5.22**	**14.40*****
	(1.48)	(1.71)	(3.82)	(4.00)	(2.29)
Child, age 6–15	**4.01*****	**-6.15*****	**5.01***	**1.22**	**17.23*****
	(1.11)	(1.36)	(2.86)	(2.77)	(1.35)
Income < 130% poverty	**5.54*****	**-10.96*****	**4.75****	**-8.26****	**5.30*****
	(0.91)	(1.34)	(2.36)	(3.70)	(1.35)
Income 130–185% poverty	**2.95*****	**-1.85**	**3.95**	**-3.51**	**3.72****
	(1.00)	(1.35)	(3.14)	(2.66)	(1.86)
Log of real income	**-2.36*****	**2.87*****	**-2.83****	**3.91****	**-1.09**
	(0.63)	(0.76)	(1.23)	(1.66)	(0.68)

Selected Average Marginal Effects on Duration of Eating & Food Preparation II

	Time in Eating				
	Primary at Home	Primary AFH	Secondary at Home	Secondary AFH	Food Prep
High school diploma	**2.08** (1.64)	**2.82*** (1.52)	**5.32** (3.41)	**11.47**** (4.89)	**-1.15** (1.58)
Some college education	**2.80** (1.76)	**4.90***** (1.53)	**6.91*** (3.88)	**15.12***** (5.64)	**-1.07** (1.61)
Bachelor's or higher degree	**4.65***** (1.80)	**6.99***** (1.58)	**7.72**** (3.80)	**15.74***** (5.76)	**-1.64** (1.97)
Holiday	**0.28** (3.62)	**6.45*** (3.41)	**2.44** (7.59)	**-1.04** (5.67)	**12.77***** (4.42)
Friday	**-2.37** (1.59)	**3.86***** (1.45)	**5.07** (4.46)	**3.74** (2.70)	**-3.22*** (1.93)
Saturday	**-0.45** (1.22)	**3.37***** (1.40)	**8.58**** (4.02)	**3.83** (3.27)	**6.42***** (1.82)
Sunday	**1.58** (1.35	**0.51** (1.29)	**11.27***** (3.51)	**-10.88***** (4.14)	**5.64***** (1.92)

Conclusions

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

Thank you! Questions?

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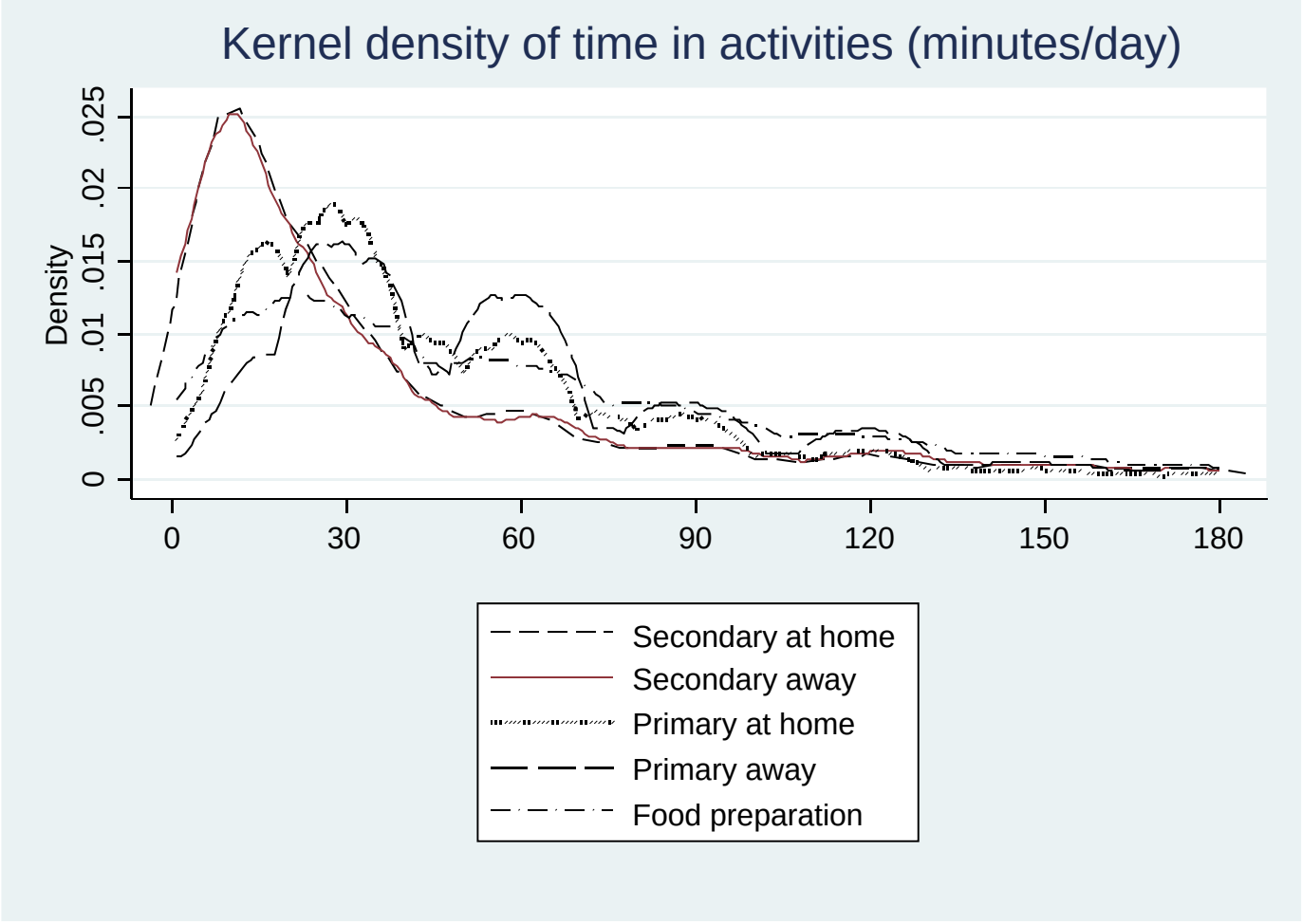
Appendix: Kernel Density Estimates



Appendix: Food Price Measures

Food-at-home price measure:

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

Fast food price measure:

- 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