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EC230

In-kind Programs: Food Stamp Program
1. Overview, trends and program details
2. Economics: Theory of labor supply and eitc
3. Empirical studies

Hoynes and Schanzenbach "Consumption Responses to In-Kind Transfers: Evidence from the Introduction of the Food Stamp Program"
Shapiro "Is there a daily discount rate: Evidence from the Food Stamp Cycle"

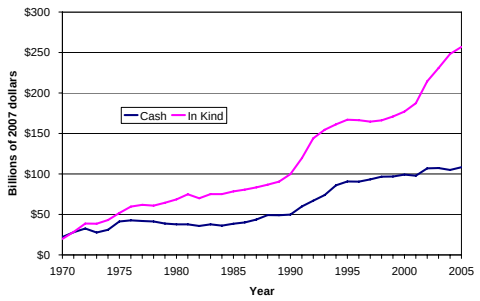
Background

- In-kind programs feature prominently in U.S. income support policies
- Economic theory has strong predictions about how in-kind transfers impact consumption
- Despite the prominence of the theory, there has been little empirical work documenting the response to in-kind transfers—the available evidence suggests a failure of the canonical model.
- The food stamp program (FSP) is closest thing the U.S. has to a universal safety net program
  - It is the largest cash or near cash means tested transfer program
  - In 2004: FSP $27 B, TANF $25 B, EITC $33 B
- We develop a new quasi-experimental approach to test theoretical predictions and estimate the impact of the FSP on:
  - food consumption and labor supply
- The identification is based on county level FSP introduction which occurred from 1961-1975

In-Kind versus Cash Assistance

- There is greater support for providing assistance to the poor through in-kind transfers rather than cash
- Supporters believe that policies providing voucher payments for certain goods (like food) will cause recipients to purchase more of these goods and recipients will not be able to use support to purchase other, less socially desirable goods
- However, if recipients are inframarginal, cash and vouchers should lead to the same outcomes
- We evaluate the impact of the FSP in the context of these predictions using the Panel Study of Income Dynamics (PSID)
- Our results show that food stamp benefits increase food consumption by a similar amount as an equivalent cash transfer consistent with the canonical model.
  - Further, households predicted to be "constrained" experience a larger increase in food consumption as predicted by the theory.

Spending on Cash and Inkind Public Assistance Programs



Overview of presentation

- Previous literature: why is the program hard to study?
- History of the food stamp program (program rollout)
- Expected effects of food stamps on consumption and labor supply
- Data
- Methods
- Results (consumption and labor supply)

What is the food stamp program?

- Means tested in-kind assistance program
  - Income and asset tests determine eligibility
- Only U.S. means tested program that is not targeted; universal safety net program
- Federal program; no area variation
- Coupons issued which can be used in stores (recently most states use debit cards)
  - Can purchase all food items except prepared foods and alcoholic beverages
- Benefits phased out as income increases; in 2005 average monthly benefit per person was $93

Previous Literature: why is the FSP hard to evaluate?

- FSP is a federal program with little cross area variation → little variation in program parameters that are typically exploited by researchers to measure program impacts
- Instead the literature has taken other approaches:
  - [main approach] Compare recipients to eligible non-recipients (with little accounting for selection into receipt). Models of program participation (Moffitt 1983, Currie 2006) suggest that take-up will be positively correlated with tastes for food consumption, leading to an upward bias.
  - Experimental evidence from cash-out experiments: finds that FS is close to cash (5% higher spending on food with voucher compared to cash)
  - Structural modeling
- Findings
  - FSP leads to increases in food consumption; larger (between 2 and 10 times as much) than if benefits are in cash (Fraker 1990 review)
  - Small/no work disincentive effects

7

An alternative identification strategy

- Since there is little *marginal* variation in food stamp benefits that leads to credible identification of the effect of the FSP, we use a different approach
  - The FSP was rolled out across the approx 3,000 counties over a relatively long period of time: 1961-1975
  - We use this variation to identify the effects of the FSP
- Using FSP implementation is largely untapped in the literature
  - Exception: Currie and Moretti (2006) examine impacts of FSP introduction on infant outcomes in California
- Part of a growing literature that exploits *program introduction* during the Civil Rights Act and Great Society period
  - Almond, Chay & Greenstone (Civil rights and infant mortality), Finkelstein & McKnight (Medicare introduction), Cascio et al (Title I), Ludwig & Miller (Head Start)
- It is important to establish that the timing of county adoption of the FSP is exogenous (come back to this later)

8

A Short History of the (modern) Food Stamp Program

- 1961 Pres. Kennedy executive order; established 8 county-level pilot programs; 1962-1963 expanded to 43 counties
- Food Stamp Act of 1964:
  - gave local areas the authority to start up FSP in their county
  - Federally funded
  - Voluntary adoption by counties
- Steady increases in county adoption; constrained by budgetary limits
- 1973 amendments to Food stamp act: mandated that all counties offer FSP by 1975
- *Goal of FSP*: promote nutritional well-being of low income persons
- Introduction and expansion of the FSP was (in part) addressing high rates of hunger and nutritional deprivation among the poor
  - 1968-70 survey of low-income families in four states (TX, LA, KY, WV) found 15% of whites and 37% of blacks had low hemoglobin levels (Eisinger 1998)

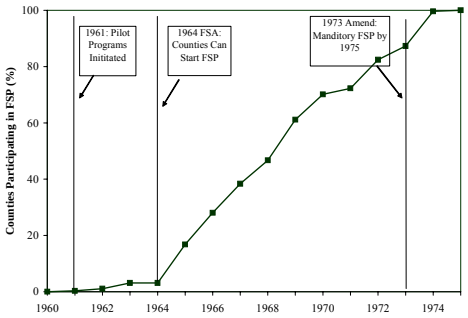
9

Figure 3: Food Stamp Program Start Date, By County (1961-1975)

- Our basic identification strategy uses this county level variation in food stamp "treatment"

11

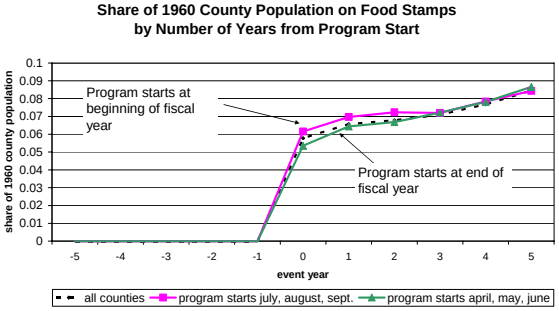
Percent of US population covered by FSP



Note: Figure shows the percent of counties participating in the FSP, weighted by the 1970 county population

12

How quickly do FS Programs ramp up?



13

Expected effects of introduction of FSP: Consumption

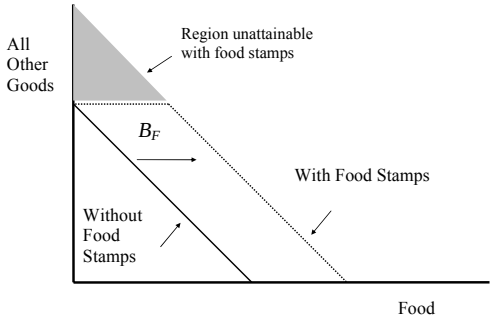
- Eligibility requirements: must satisfy income and asset tests
- Purchase requirement: household pays some amount out-of-pocket and then receives food stamps

  Food stamp "benefit" or *bonus coupons* (B_F)

  = Face value of food stamps – Purchase requirement
- Analyze choice of food vs nonfood consumption
- This analysis (and its predictions) assume that the price of food is unchanged with the introduction of FSP. This is valid if the FS population is small relative to the full population (8% of families participate)
- Basic static model with food and nonfood as normal goods

14

Fig 6: Food Stamps and Food/Nonfood consumption: no purchase requirement



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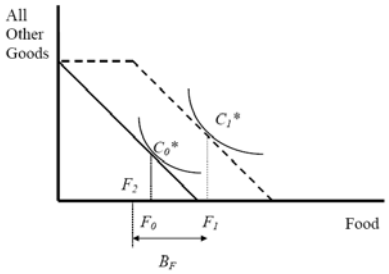


Predictions for inframarginal recipient:

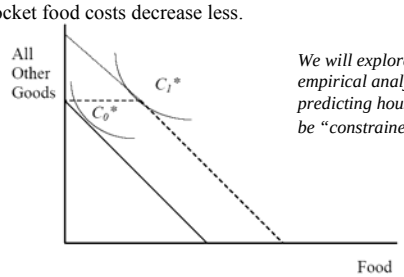
Nonfood and food consumption increases ($F_0 \rightarrow F_1$)

Out of pocket food spending decreases ($F_0 \rightarrow F_2$)

Overall food consumption goes up by less than food stamp benefit

16

If desired food consumption is low relative to the food stamp benefit, then total food consumption increases more and out of pocket food costs decrease less.

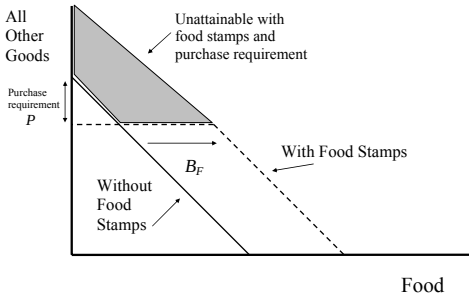


We will explore this in our empirical analysis by predicting households likely to be "constrained"

Support for food stamps as in-kind transfer (instead of cash) is partially derived from this prediction of a larger increase in food consumption. Only true for constrained families.

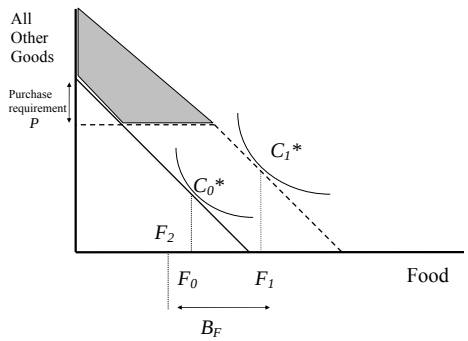
17

Figure 7: Incorporating purchase requirement



Prior to 1979 (and during our analysis period) families had to make a cash up-front payment to receive the food stamp benefits. This "purchase requirement" did not change the magnitude of the benefits a family received.

18



With the purchase requirement, more households may be constrained and therefore the there may be larger overall impacts on food consumption.

Implications of the theory that are testable in the PSID

- Expected effects of food stamp introduction:
  - Out of pocket food spending: DECREASE
  - Total food spending (including value of FS): INCREASE
    - Larger increase for constrained households
  - Meals out: ambiguous effect (income effect +, substitution −)
  - [Unfortunately, the PSID does not allow us to test for the impact on nonfood expenditures]
- Equivalence of food stamps and cash income
  - If most households are inframarginal, then food stamps and cash should lead to same impact on food spending
  - We compare our estimates of the MPC_f out of food stamps and cash

Methodology

- Use variation across counties in difference-in-difference model:

$$y_{ict} = \alpha + \delta FSP_{ct} P_g + X_{it}\beta + \theta_g + \theta_g t + \eta_c + \lambda_t + \phi_{st} + \varepsilon_{ict}$$

- Observations are families *i* living in county *c* in time period *t*
- To allow for variation in the probability of being treated across families, the county treatment dummy is interacted with a group specific FSP participation rate P_g (as in Banerjee et al 2007, Bleakley 2007). 24 groups defined by education, marital status, children, and race.
- Identification comes from variation across counties over time in adoption of FSP (FSP_{ct})
- Fixed effects for group, group*time, county, time and state*linear year (or state*year)
- All regressions are weighted using the PSID family weight; standard errors clustered on county

Table 2: Food Stamp Participation Rates (1976-78 PSID, all races)

		Education Group		
	All	Less than HS	High School Grad	More than HS
A. All Races				
All family types	0.08	0.14	0.06	0.02
Single with children	0.32	0.46	0.23	0.15
Married with children	0.07	0.14	0.06	0.01
Single, no children	0.07	0.14	0.05	0.03
Married, no children	0.02	0.04	0.01	0.01
Single, no children elderly	0.07	0.10	0.03	0.01
Married, no children elderly	0.03	0.05	0.00	0.00
Nonwhite single with children	0.51	0.56	0.44	0.43

- Despite universal eligibility, the highest participation rates are for female headed households (highest for nonwhite female heads)
- Consequently, we also estimate models for subgroups: all female heads, nonwhite female heads

Exogeneity of FSP adoption

- County adoption was voluntary until mandated in 1975
- Political battle between farm interests (supporting CDP) and advocates for the poor (supporting FSP)
- If differences between counties affected the timing of FSP adoption AND if the trends in outcomes are correlated with this timing, then our identification is not valid

What we do:

1. Control for predictors of county FSP introduction (interacted with linear time trend)
2. Control for contemporaneous measures of county public transfer spending (on health , welfare, retirement and disability)

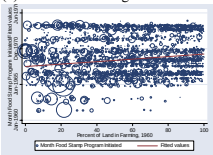
(Results are not changed substantively by these controls)

Concern 1: Endogenous policy adoption

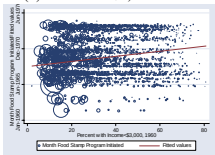
- Explore determinants for FSP adoption
- Regress a continuous measure of month of FSP start date (=1 in January 1961) on county pre-treatment variables (from 1960 City and County Data Book) and state fixed effects.
- We find (see Table 1) that consistent with political accounts, earlier county food stamp adoption occurs for counties with:
  - Larger % of population black, poor, urban
  - Larger population
  - Smaller % of land used in farming
  - Significantly smaller impacts for counties in the South

While this analysis shows statistically significant impacts of the county characteristics, overall most of the variation remains unexplained.

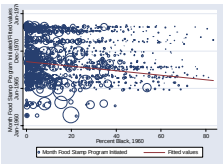
(a) % land in farming



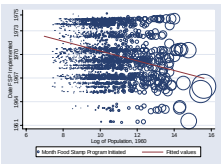
(b) % income<$3,000



(c) % black



(d) log of population



"The program was quite in demand, as congressmen wanted to reap the good will and publicity that accompanied the opening of a new project. At this time there was always a long waiting list of counties that wanted to join the program. Only funding controlled the growth of the program as it expanded."

(Berry 1984, p. 36-37)

Nonetheless, we add controls for the interaction between these determinants of the FSP adoption and time to the main models to control for the possible (observed) predictors of adoption (as in Acemoglu, Autor and Lyle 2004).

Concern 2: Correlation with other program expansions during the great society period

- The expansion of the food stamp program took place during a period of expansion of government programs
- If the expansion in these programs is correlated with county FSP adoption, then our results may be biased
- Most likely the state/year fixed effects will absorb most of this variation
- We also include measures of annual per capita real government transfers at the county level (Source: BEA REIS data):
  - Welfare programs (AFDC, SSI, General Assistance)
  - Health programs (Medicare, Medicaid, Military programs)
  - Retirement and Disability programs

Final Specification

$$y_{ict} = \alpha + \delta FSP_{ct} P_g + X_{it}\beta + \boxed{\gamma_1 Z_{c60} * t + \gamma_2 TP_{ct}} + \theta_g + \theta_g t + \eta_c + \lambda_t + \phi_{st} + \varepsilon_{ict}$$

- Adding determinants of county FSP adoption (Z_{c60}) interacted with time and per capita county government transfer payments TP_{ct}

Data and outcomes: PSID

- Panel data; we use 1968-1978
  - End in 1978 so that entire period is during purchase requirement
- Outcome variables—Food Expenditures
  - Log of (out of pocket expenditures for food at home)
  - Indicator for meals eaten out
  - Indicator for food stamp receipt
  - Log of (total food expenditures): includes food stamp benefits and meals eaten out
- Outcome variables—Labor Supply
  - Head working now, annual hours, annual earnings
  - Log of family (cash) income
- We estimate weighted regressions; standard errors clustered on county
- Assign county level FSP availability (county codes available in PSID with access to *geocode* file)

Table 3: Impact of FSP introduction on family food expenditures: All nonelderly families/singles

	(1)	(2)	(3)	(4)	(5)
A. Log(Real Expenditures on Food at Home)					
County FSP Implemented X	0.061	-0.034	-0.034	-0.042	-0.050
Group Participation Rate	(0.089)	(0.094)	(0.093)	(0.085)	(0.090)
B. Any Meals Out (0/1)					
County FSP Implemented X	-0.109	-0.040	-0.040	-0.045	-0.046
Group Participation Rate	(0.081)	(0.081)	(0.082)	(0.082)	(0.085)
C. Log (Real Total Food Expenditures)					
County FSP Implemented X	0.212	0.184	0.184	0.174	0.179
Group Participation Rate	(0.080)***	(0.082)**	(0.082)**	(0.073)**	(0.075)**
Demographics	X	X	X	X	X
1960 Cty Vars * Linear Time	X	X	X	X	X
Year and County Fixed Effects	X	X	X	X	X
Group Fixed Effects	X	X	X	X	X
Group * linear time	X	X	X	X	X
Per Capita Cty Transfers			X	X	X
Log(Real Family Income)				X	X
State x Linear Time		X	X	X	
State x Year Fixed Effects					X

All models include controls for: demographics, group, year and county fixed effects, group*linear trend, and 1960 County variables * linear trend.

Interpretation

- Remember the treatment dummy is interacted with a group specific FSP participation rate.
- Therefore, the results are interpretable as the impact on the average "treated" family—one that takes up the program when it is offered in the county.

31

Constrained vs inframarginal households

- Constrained households should experience larger increases in food consumption than inframarginal households.
- We predict constrained status (because observed constrained status is endogenous and only measureable for food stamp recipients)
  - Predict food expenditures in auxiliary regression; rich nonparametric controls for numbers and ages of family members, cubic in income, state and year fixed effects
  - Compare predicted food expenditures to food stamps that the family is eligible for (given income and family size)
  - Interact the treatment effect with constrained dummy
- Results show that total food consumption increases by 25 percent for (those predicted to be) constrained compared to 15 for inframarginal.
- Consistent with predictions of the theory. Confirms the experimental results in Schanzenbach (2007)

32

Equivalence of cash and food stamps

- An additional test of the theory is that if households are mostly inframarginal, then an additional dollar of cash income and an additional dollar of food stamp income should lead to the same increase in food expenditures.
- We use the model estimates to calculate implied marginal propensity to consume food (MPC_f) out of food stamps and cash income
- These estimates may shed light on the puzzling finding in the non-experimental literature that that the MPC_f out of food stamps >> MPC_f out of cash income
- Note, we are cautious in interpreting these findings because our experiment does not create a *marginal* change in food stamps.

33

Estimated MPC_f out of Food Stamps and Cash Income (Table 6)

		Regression Estimates		Estimated MPC_f for treated	
	N	Coef (SE) FS Elig	Coef (SE) log(income)	MPC_f Food	MPC_f Income
(1) All nonelderly singles and families	39,623	0.174	0.295	0.163	0.086
		(0.073)**	(0.007)***		

- In contrast to the prior literature, our quasi-experimental evidence suggests that the MPC_f out of food stamps is quite similar in magnitude to the MPC_f out of cash income
- Nonetheless, some differences remain. Why might the MPC_f out of food stamps exceed the MPC_f out of income?
  - FSP more permanent source of income compared to earnings (?)
  - mental accounting; FS benefits provides a marker for food expenditures
  - intrahousehold bargaining; who has control over food stamps compared to cash income (Lundberg and Pollak 1993)
  - constrained

34

Estimated MPC_f out of Food Stamps and Cash Income (Table 6)

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(1) All nonelderly singles and families	39,623	0.174	0.295	0.163	0.086
		(0.073)**	(0.007)***	[0.029,0.298]	[0.082,0.091]
(2) Nonelderly <=$50,000	23,660	0.227	0.270	0.209	0.086
		(0.072)***	(0.012)***	[0.078,0.338]	[0.078,0.093]
(3) Nonelderly <=$35,000	16,079	0.228	0.262	0.201	0.091
		(0.083)***	(0.015)***	[0.057,0.345]	[0.081,0.102]
(4) Nonelderly, <=$25,000	13,048	0.282	0.285	0.238	0.111
		(0.114)**	(0.024)***	[0.049,0.428]	[0.093,0.129]
(5) Nonelderly, head<=12 years of education	30,905	0.228	0.278	0.219	0.084
		(0.069)***	(0.008)***	[0.089,0.348]	0.079,0.089]
(6) Nonelderly, nonwhite	15,990	0.258	0.270	0.317	0.086
		(0.079)***	(0.014)***	[0.126,0.508]	[0.077,0.095]
(7) All female heads	6,002	0.095	0.289	0.297	0.098
		(0.041)**	(0.019)***	[0.042,0.549]	[0.085,0.110]
		0.262	*0.798*		
(8) Nonwhite female heads	4,501	0.055	0.286	0.165	0.101
		(0.045)	(0.026)***	[-0.099,0.428]	[0.083,0.120]
		0.101	*0.525*		

35

- As the sample becomes more disadvantaged (lower education, income, etc), the MPC food out of food stamps increases relative to the MPC food out of cash income.
- This suggests that more of the lowest income families are constrained. This is to be expected given that the lower the income level, the larger the shift out in the budget constraint. A similar result was found by Schanzenbach (2007) in an analysis of experimental data.

36

What we are doing now

- This paper establishes that FSP is an important "income support" program; and that its introduction leads to increases in family resources. (possibly better nutrition?)
- Further, our first paper shows that food stamps are "like cash"; and there is little good evidence on the causal impact of income on health.
- We are using the same research design to examine the impact of the FSP on infant health, using rich county-level vital statistics on birth outcomes and infant mortality
  - We find that FSP leads to increases in birthweight and decreases in low birthweight births
  - We find no evidence that the FSP leads to improvements in infant mortality
- We are also just starting a project that links childhood exposure to FSP to adult health outcomes (e.g. obesity, BMI, disability). The introduction of the FSP leads to exogenous variation in early life exposure.

Analysis of Detailed Natality Data

- Microdata with census of all births in the U.S. available starting in 1968
- Data identifies state and county of residence (and occurrence) of birth
- We use this data to examine how the introduction of the FSP affects birth outcomes:
  - Birthweight
  - Probability of low birth weight (<2,500 grams) and very low birth weight (<1,500 grams)
  - Gestation preterm (<37 weeks)
- FSP may improve birth outcomes by improving the nutritional intake of the mother
- Birth outcomes have been shown to be an important predictor of subsequent health

Empirical Model:

- Main results: data is collapsed to the county-quarter level separately for whites and blacks (drop county if no birth in any quarter)
- Detailed results: Estimates by age, education, and legitimacy (for sample reporting these variables)
- Policy variable (FSP) reflects whether program is in place as of beginning of 3rd trimester of pregnancy
- Fixed effects: county, year*quarter, state*year
- Cluster on county

Table 2: Birth Outcomes (Part 1), Whites

	Birthweight in grams				
	(1)	(2)	(3)	(4)	(5)
A. WHITES					
Ave FSP (0/1)	1.9718	2.0358	2.6313	2.0854	2.1750
	(0.94)	(0.93)	(0.88)	(1.02)	(0.9748)
1960 CCDB * linear time	x	x	x	x	x
REIS controls	x	x	x	x	x
cty per cap real income		x	x	x	x
yr x qtr fixed effects	x	x	x	x	x
county fixed effects	x	x	x	x	x
state * linear time			x		
state * year fixed effects				x	
county * linear time					x
Observations	97785	97785	97785	97785	97785
R-squared	0.54	0.54	0.55	0.55	0.56
Mean of dependent variable	3350	3350	3350	3350	3350
% impact (coeff/mean)	0.06%	0.06%	0.08%	0.06%	0.06%
Impact, inflated	15.65	16.16	20.89	16.55	17.26
% impact, inflated	0.47%	0.48%	0.62%	0.49%	0.52%
Subsample Population (whites)	0.98	0.98	0.98	0.98	0.98

Table 2: Birth Outcomes (Part 2), Whites

	Fraction < 2,500 grams					Fraction < 1,500 grams				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
A. WHITES										
Ave FSP (0/1)	-0.0006	-0.0008	-0.0006	-0.0008	-0.0006	-0.0001	-0.0001	-0.0002	-0.0002	-0.0002
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
1960 CCDB * linear time	x	x	x	x	x	x	x	x	x	x
REIS controls	x	x	x	x	x	x	x	x	x	x
cty per cap real income		x	x	x	x		x	x	x	x
yr x qtr fixed effects	x	x	x	x	x	x	x	x	x	x
county fixed effects	x	x	x	x	x	x	x	x	x	x
state * linear time			x					x		
state * year fixed effects				x					x	
county * linear time					x					x
Observations	97785	97785	97785	97785	97785	97785	97785	97785	97785	97785
R-squared	0.17	0.17	0.17	0.18	0.19	0.05	0.05	0.05	0.06	0.08
Mean of dependent variable	0.06	0.06	0.06	0.06	0.06	0.01	0.01	0.01	0.01	0.01
% impact (coeff/mean)	-0.98%	-1.02%	-1.02%	-0.97%	-0.97%	-1.10%	-1.10%	-2.40%	-2.30%	-2.30%
Impact, inflated	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
% impact, inflated	-7.81%	-8.07%	-8.07%	-7.67%	-7.67%	-8.23%	-8.73%	-19.05%	-18.28%	-18.26%
Subsample Population (whites)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98

Table 2: Birth Outcomes, Blacks

	Birthweight				
	(1)	(2)	(3)	(4)	(5)
B. BLACKS					
Ave FSP (0/1)	3.4755	3.5310	4.1151	5.4466	1.6646
	(2.6272)	(2.6380)	(2.2742)	(2.5318)	(2.3302)
1960 CCDB * linear time	x	x	x	x	x
REIS controls	x	x	x	x	x
cty per cap real income		x	x	x	x
yr x qtr fixed effects	x	x	x	x	x
county fixed effects	x	x	x	x	x
state * linear time			x		
state * year fixed effects				x	
county * linear time					x
Observations	27374	27374	27374	27374	27374
R-squared	0.32	0.32	0.33	0.34	0.35
Mean of dependent variable	3096.67	3096.67	3096.67	3096.67	3097.01
% impact	0.11%	0.11%	0.13%	0.18%	0.05%
Impact, inflated	8.4354	8.5703	9.9880	13.2197	4.0402
% impact, inflated	0.27%	0.28%	0.32%	0.43%	0.13%
Subsample Population (blacks)	0.94	0.94	0.94	0.94	0.94

Table 2: Birth Outcomes, Blacks

	Fraction < 2,500 grams (1)	(2)	(3)	(4)	(5)	Fraction < 1,500 grams (1)	(2)	(3)	(4)	(5)
B. BLACKS										
Ave FSP (0/1)	-0.0015	-0.0015	-0.0016	-0.0019	-0.0009	-0.0007	-0.0007	-0.0008	-0.0013	-0.0004
	(0.0010)	(0.0010)	(0.0010)	(0.0012)	(0.0012)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0007)
1960 CCDB * linear time	x	x	x	x	x	x	x	x	x	x
REIS controls	x	x	x	x	x	x	x	x	x	x
cty per cap real income		x	x	x	x		x	x	x	x
yr x qtr fixed effects	x	x	x	x	x	x	x	x	x	x
county fixed effects	x	x	x	x	x	x	x	x	x	x
state * linear time			x					x		
state * year fixed effects				x					x	
county * linear time					x					x
Observations	27374	27374	27374	27374	27374	27374	27374	27374	27374	27374
R-squared	0.15	0.15	0.15	0.17	0.18	0.11	0.11	0.11	0.13	0.14
Mean of dependent variable	0.13	0.13	0.13	0.13	0.13	0.02	0.02	0.02	0.02	0.02
% impact	-1.14%	-1.14%	-1.21%	-1.46%	-0.68%	-3.70%	-3.55%	-4.20%	-6.60%	-1.85%
Impact, inflated	-0.0036	-0.0036	-0.0038	-0.0046	-0.0021	-0.0018	-0.0017	-0.0020	-0.0032	-0.0009
% impact, inflated	-2.76%	-2.76%	-2.93%	-3.55%	-1.64%	-8.98%	-8.62%	-10.19%	-16.02%	-4.49%
Subsample Population (blacks)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94

43

Analysis of Detailed Mortality Data

- Microdata with census of all deaths in the U.S. available starting in 1968 (will soon extend back to 1959)
- Data identifies state and county of residence (and occurrence of death)
- We use this data to examine how the introduction of the FSP affects infant mortality.
  - Today I have results for neonatal infant mortality (<one month old); we will expand to all infant deaths (and possibly older ages as well)
- Neonatal deaths appear to be strongly related to health during pregnancy/delivery so we assign the FSP as of the beginning of the 3rd trimester (as with the analysis of birth outcomes)
- Dependent variable is "cohort" infant mortality rate: neonatal deaths among those born in quarter t divided by live births in quarter t (constructed using natality micro data).

44

Classifying causes of death (Table 6)

	Cause of Death	ICD-8 Code (1968-1978)
1	Congenital Anomalies	740-759
2	Respiratory Distress	776.1,776.2
3	Disorders of short gestation and unspecified low birthweight	777
4	Infections specific to the perinatal period	038
5	Pneumonia and influenza	470-474,480-486
6	Newborn affected by maternal complications of pregnancy	769.0-769.2,769.4,769.5,769.9
7	Intrauterine hypoxia and birth asphyxia	776.9
8	Newborn affected by complications of placenta, cord, and membranes	770,771
9	Certain gastrointestinal diseases	004,006-009,535,561,563
10	Diseases of the heart	390-398,402,404,410-429
11	SIDS	795.0
12	Accidents and adverse events	E800-E949
13	Birth trauma	764-768(.0-.3), 772
14	Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice*	774,775
15	All Other	all other codes

Cause of Death Categories Used in Regressions	Category Numbers
All causes of death	1-15
Nutrition Linked 1 *(41% of neonatal deaths, 1960)*	1-5
Nutrition Linked 2 *(84% of neonatal deaths, 1960)*	1-10
Not nutrition linked 1-- Accidents) *(1% of neonatal deaths)*	12
Not nutrition linked 2 *(7% of neonatal deaths)*	11-14

45

Linear Infant Mortality Rates

	outcome 1 (all deaths) (1)	(2)	(3)	(4)	outcome 2 (nutrition #1) (5)				outcome 3 (other #1)			
All Races												
Ave FSP (0/1)	-0.1934	-0.1931	-0.1317	0.0021	-0.2068	-0.2091	-0.1261	-0.0994	0.0135	0.0161	-0.0055	0.1014
	(0.1111)	(0.1114)	(0.1203)	(0.1151)	(0.09380)*	(0.09399)*	(0.0870)	(0.0830)	(0.0810)	(0.0811)	(0.0831)	(0.0893)
Whites												
Ave FSP (0/1)	-0.0945	-0.0975	-0.0540	0.0055	-0.1102	-0.1131	-0.0552	-0.0713	0.0158	0.0156	0.0012	0.0768
	(0.0936)	(0.0937)	(0.1009)	(0.1140)	(0.0726)	(0.0729)	(0.0739)	(0.0799)	(0.0747)	(0.0746)	(0.0795)	(0.0887)
Blacks												
Ave FSP (0/1)	-0.6178	-0.5995	-0.5286	0.0046	-0.7267	-0.7225	-0.5640	-0.3170	0.1089	0.1230	0.0354	0.3216
	(0.4591)	(0.4510)	(0.4745)	(0.4199)	(0.4036)	(0.4005)	(0.3299)	(0.2785)	(0.2566)	(0.2550)	(0.2671)	(0.2990)
1960 CCDB * linear time	x	x	x	x	x	x	x	x	x	x	x	x
REIS controls	x	x	x	x	x	x	x	x	x	x	x	x
cty per cap real income		x	x	x		x	x	x		x	x	x
yr x qtr fixed effects	x	x	x	x	x	x	x	x	x	x	x	x
county fixed effects	x	x	x	x	x	x	x	x	x	x	x	x
state * linear time			x				x				x	
state * year fixed effects				x				x				x
Observations (all)	123275	123275	123275	123275	123275	123275	123275	123275	123275	123275	123275	123275
R-squared (all)	0.16	0.16	0.16	0.16	0.10	0.10	0.10	0.11	0.12	0.12	0.12	0.12
mean of dependant variable (all)	13.97	13.97	13.97	13.97	7.32	7.32	7.32	7.32	6.65	6.65	6.65	6.65
Coeff/Mean	-0.0138	-0.0138	-0.0094	0.0001	-0.0283	-0.0286	-0.0172	-0.0136	0.0020	0.0024	-0.0008	0.0153
Subsample Population (all)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Observations (white)	123212	123212	123212	123212	123212	123212	123212	123212	123212	123212	123212	123212
R-squared (white)	0.11	0.11	0.11	0.11	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08
mean of dependant variable (white)	13.16	13.16	13.16	13.16	7.03	7.03	7.03	7.03	6.13	6.13	6.13	6.13
Coeff/Mean	-0.0072	-0.0074	-0.0041	0.0004	-0.0157	-0.0161	-0.0079	-0.0101	0.0026	0.0025	0.0002	0.0125
Subsample Population (white)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Observations (black)	64214	64214	64214	64214	64214	64214	64214	64214	64214	64214	64214	64214
R-squared (black)	0.08	0.08	0.09	0.09	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.08
mean of dependant variable (black)	20.94	20.94	20.94	20.94	10.18	10.18	10.18	10.18	10.76	10.76	10.76	10.76
Coeff/Mean	-0.0295	-0.0286	-0.0252	0.0002	-0.0714	-0.0710	-0.0554	-0.0311	0.0101	0.0114	0.0033	0.0299
Subsample Population (black)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

46

Shapiro "Is there a daily discount rate" JPUBE

- Simple paper that uses variation in the timing of food stamp receipt to examine the preferences for intertemporal substitution among low income families
- Tests for short run impatience (not much evidence outside of lab experiments)
- This paper is another good example of the growing reach and influence of behavioral economics
- Shapiro is a major player in this group

47

Impatience and time preference

- Time preference (discounting): how large a premium an individual has for consumption nearer in time compared to consumption later
  - Higher time preference (higher discounting of future consumption) →higher *discount rate* (lower *discount factor*)
  - Impatient = higher rate of time preference
- Shortrun vs long run discounting and impatience
  - Very small amounts of SR discounting → huge annual discounting (in the exponential model)
  - Laibson's quasi-hyperbolic discounting model severs link between SR and LR time preference. Predicts significant impatience in the SR.

48

The empirical setting

- Continuing survey of food intake by individuals (CSFII)
  - Occasional cross sectional survey of US families
  - Use food diaries to capture detailed food intake
  - Nutritionists then use this to map into "consumption" of nutrients, calories, etc.
  - The survey also asks about food stamp receipt AND the date of the last benefit payment.
- They assume that the date of last benefit payment is exogenous (and that the date of the interview is exogenous) → exogenous measure of the number of days since benefit payment received

Things in the empirical implementation I was confused about

- What fraction of the sample is on food stamps? I have NO idea how they got to 6,000 obs
- Do they use the nonfood stamp recipients? If so, how do they set the number of days since benefit receipt?
- Do they use each multiple observations per person (e.g. more than one day of food diaries)? It seems they do; they mention adjusting standard errors for possible correlation within household.

Table 1
Monthly patterns in food intake

Dependent variable	(1) log(caloric intake)	(2) log(caloric intake)	(3) caloric intake	(4) log(food valu
Days since receipt of food stamps	−0.0045	−0.0040	−7.9439	−0.0073
	(0.0021)	(0.0019)	(3.1772)	(0.0038)
Demographics?	No	Yes	No	Yes
Dataset	CSFII	CSFII	CSFII	NFCS
Number of observations	6652	6652	6652	309
R^2	0.0796	0.1895	0.0966	0.6013

Main results show that quantity and quality of food intake decrease with days since last food stamp benefit receipt.

Linear in days? What if they estimated this more nonparametrically?

Interpretation of results

- Caloric intake declines by 10-15 percent over FS month
- If exponential discounter, this implies annual discount factor of 0.23

$$U = \sum_{t=0}^{T} \delta^t u(C_t)$$

$\delta =$ discount factor

$\gamma =$ discount rate $= -\log \delta$

- Results are consistent with quasi-hyperbolic discounting:

At time t, utility in t+j is valued at $\beta\delta^j u(C_{t+j})$

$\beta =$ the estimates a consistent with 0.96 (similar to estimates in literature)

Other explanations for results

- Intertemporal substitution: If calories today are a good substitute for calories tomorrow, then a small amount of time preference can generate pattern of declining consumption over the month.
  - For this to be valid, you can not have declining marginal utility of food (or month) over the month
  - They present evidence from another survey showing that household MU of money is increasing with days since FS receipt (they are increasingly willing to accept <$50 in cash today in exchange for $50 in 4 weeks)
  - And this willingness is highest in the last 7 days of the cycle.

Table 3
Monthly patterns in the need for cash: 1-week horizon dependent var.: Pr(would accept less than $50 now in exchange for $50 in 1 week)

	(1)	(2)	(3)	(4)
Last 7 days of food stamp month	0.1208	0.1551	0.0646	0.0658
	(0.0697)	(0.0719)	(0.0226)	(0.0223)
Demographics?	No	Yes	No	Yes
Sample	Non-imputed only		All	
Number of observations	225	225	1100	1100
(Pseudo-)R^2	0.0097	0.0650	0.0137	0.0235

Other things they look at

- Not explained by:
  - Single vs multi families households (competition for food)
  - Eating in other's homes later in FS cycle
  - Depreciation of food stock (holds for those shopping frequently or infrequently)

55

Policy implications

- In quasi-hyperbolic discounting, outcomes are suboptimal in that individuals would be willing to pay for a device to reduce overconsumption in early periods.
- EBT → more frequent payments during the month?

56