

Local Food Prices, SNAP Purchasing Power, and Child Health

Hilary Hoynes
University of California Berkeley

Joint with Erin Bronchetti and Garret Christensen

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Overview

- SNAP, or Food Stamps, is a central element of the U.S. safety net
- Only universal program in the U.S.
- Raises 1.5 million children from poverty; at the peak of the Great Recession 1 of 7 people received benefits
- Research is limited: Federal program with little variation across place and over time represents a challenge for causal identification
- We use a new source of variation – local area price variation – and estimate impacts of SNAP on child health and food security

Why causal identification is difficult with SNAP

- Universal program (no ineligible groups)
- Federal program (little variation across states, localities)
- Little variation over time (few reforms)
- Negative selection: SNAP serves people when they need the program – it is difficult to disentangle the (presumably positive) impact of SNAP from the (presumably negative) impact of the circumstances that made a family eligible for the program.

Prior approaches to identification problem

- Comparisons of the same family pre- and post-SNAP take-up (or other family and sibling fixed effects estimators)
- Use available policy variation across states and over time (IV or difference-in-difference)
- Leverage sharp time series temporal variation (e.g. expansion and subsequent reduction in benefits from federal stimulus)
- Changes in eligibility from welfare reform (affects only immigrants)
- Program rollout

What we do

- SNAP maximum benefits are fixed across the 48 states yet local prices vary significantly across place
- We construct a measure of *SNAP purchasing power* = Max Benefit / local price
- Identification comes from differences in local trends across place
- We find that higher SNAP purchasing power leads to lower rates of food insecurity, lower absences from school and less utilization of health care
- Our work makes two contributions:
 1. Exploring this new source of variation for SNAP
 2. Adding to the few studies that examine impacts of SNAP on child health (East 2015)

How might purchasing power affect health?

- Direct: higher purchasing power could lead to higher quantity and/or quality of food
- Indirect: higher purchasing power could lead to increase in other beneficial goods such as health care
- Stress and Bandwidth: higher purchasing power could lead to lower stress, improve decision-making and compliance with child activities (getting to school and doctor) consistent with Bertrand, Mullainathan, and Shafir (2004)

Prior Work: SNAP and child health

- Using the quasi-experimental variation of the historical rollout of food stamps shows that the program leads to improvement in birth outcomes (Currie and Morretti 2008, Almond, Hoynes and Schanzenbach 2015) and access in childhood leads to improvements in adult health (Hoynes et al 2016).
- East (2015) uses variation in immigrant access to food stamps as a result of welfare reform and finds that additional childhood exposure to food stamps (between ages 0–5) leads to a reduction in poor health and school absences in later childhood.

Prior Work: SNAP and Food Insecurity

- Fairly consistent evidence that SNAP reduces food insecurity
- Comparisons of the same family pre- and post-SNAP take-up (Mabli et al 2013, Mabli and Ohls 2015)
- Variation in state implementation policies that generates differences in take-up across states over time (Mykerezi & Mills 2010; Ratcliffe et al. 2011 Shaefer & Gutierrez 2013; Yen et al. 2008)
- Expansions in benefits from federal stimulus (Nord and Prell 2011)

Roadmap

1. SNAP background and its place in the U.S. social safety net
2. SNAP purchasing power
3. Empirical model
4. Data
5. Results
6. Conclusions

1. SNAP Background

What is SNAP and how does it fit into the US Social Safety Net?

- Previously known as Food Stamps
- In FY2018, SNAP served 41 million people in 20 million households at a cost of \$64 billion dollars
 - Average monthly benefit \$253 per household, About \$4 per person per day
- Central element of the U.S. social safety net and main government policy aimed at reducing food insecurity; available nationwide since 1975
- Survived welfare reform in the 1990s intact but many current proposals for reforming the program: adding work requirements, converting to a block grant, etc.

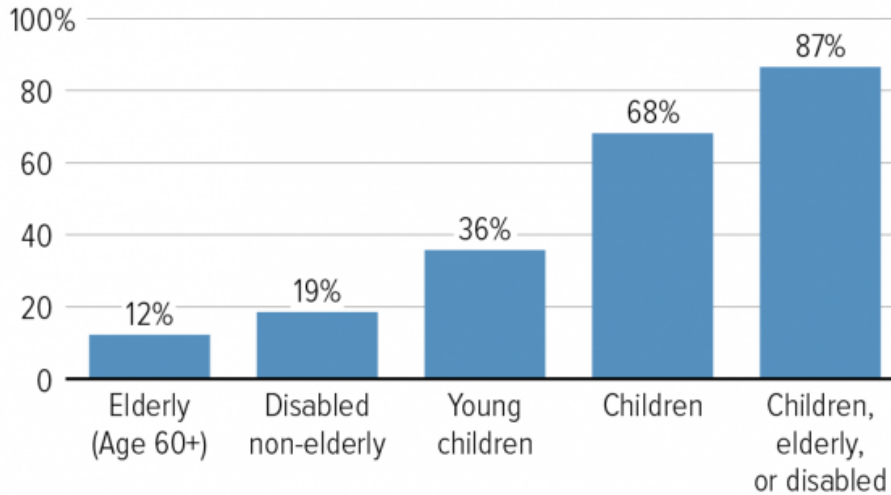
SNAP Eligibility and Benefits

- Eligibility: gross monthly income below 130% FPL, net income below 100% FPL.
- Benefits: phased out as income increases; at a 30% rate
$$B = G - 0.3 (\text{net income})$$
- Only area variation comes through deductions to gross income (housing, childcare) but this is insufficient to equalize SNAP benefits across geographic areas (Breen et al 2011)
- “Voucher”: Benefits distributed through debit card and can be used to purchase most food items at the grocery store
- Prior research shows SNAP benefits are equivalent to cash (e.g., Hoynes and Schanzenbach *AEJ Applied* 2009) though Hasting and Shapiro (2017) show higher MPC out of food stamps

Who receives SNAP?

Vast Majority of SNAP Recipients Live in Households With a Child, Senior, or Person with a Disability

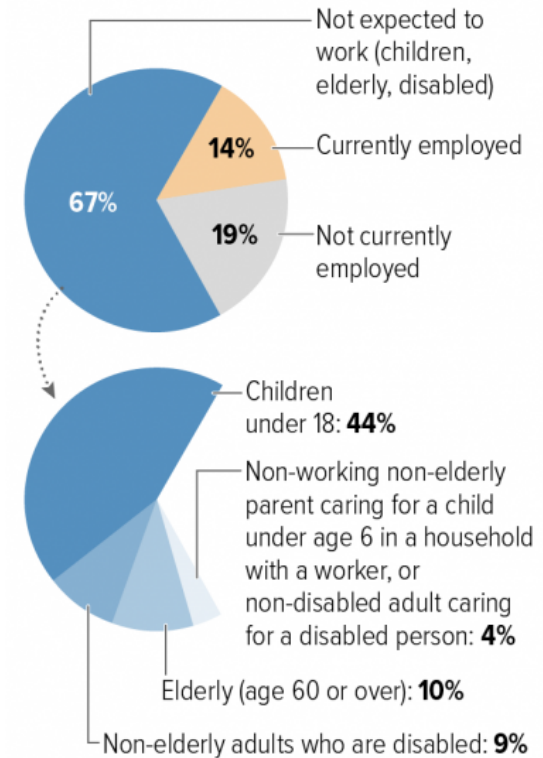
Percent of individuals in households, fiscal year 2015



Source: USDA Food and Nutrition Service, Office of Research and Analysis, "Characteristics of Supplemental Nutrition Assistance Program Households, Fiscal Year 2015."

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4 Out of 5 SNAP Participants Are Not Expected to Work or Are Working

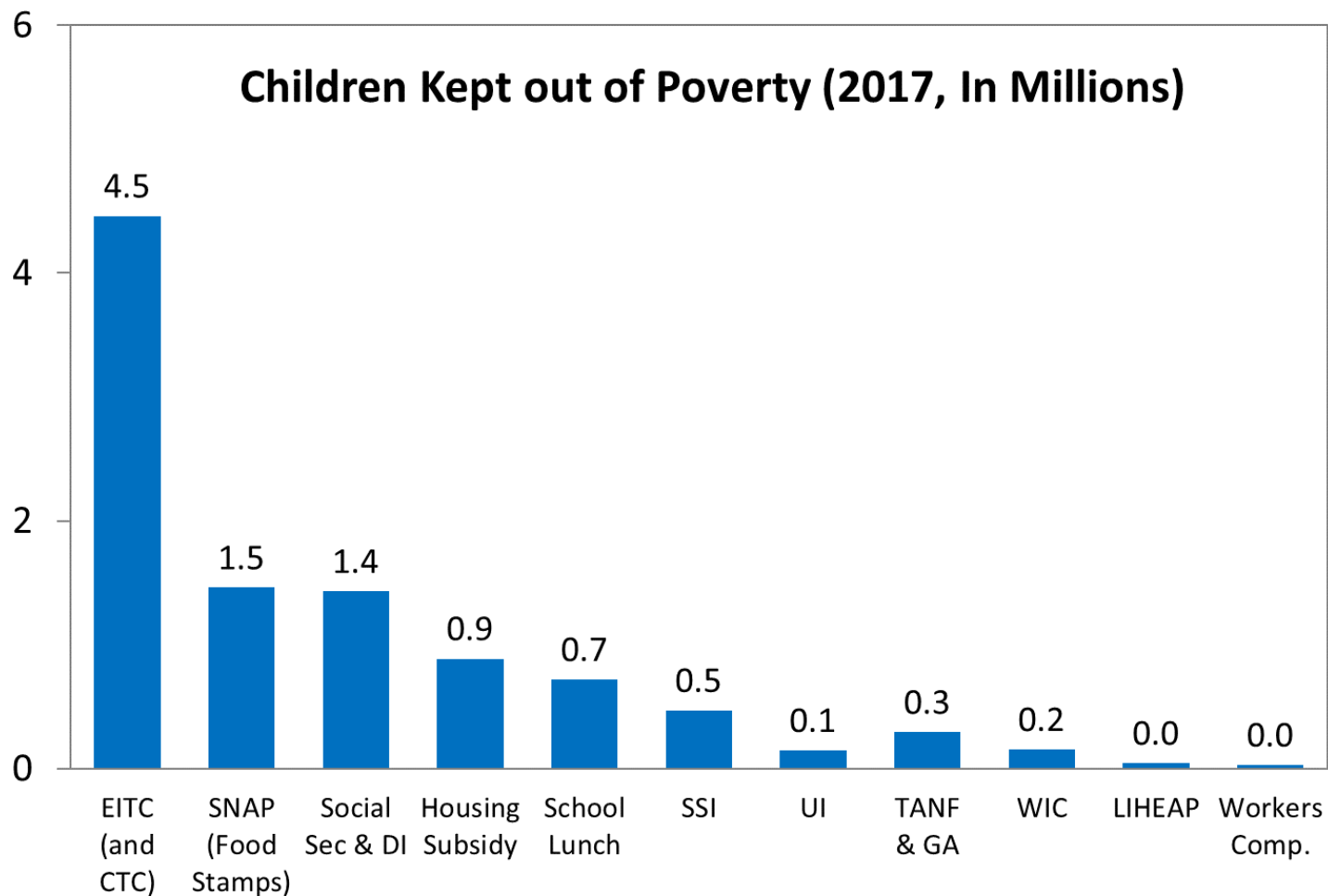


Note: This chart takes out individuals with earnings first, and then looks at those "not expected to work" among individuals without earnings.

Source: CBPP analysis of 2015 SNAP household characteristics data.

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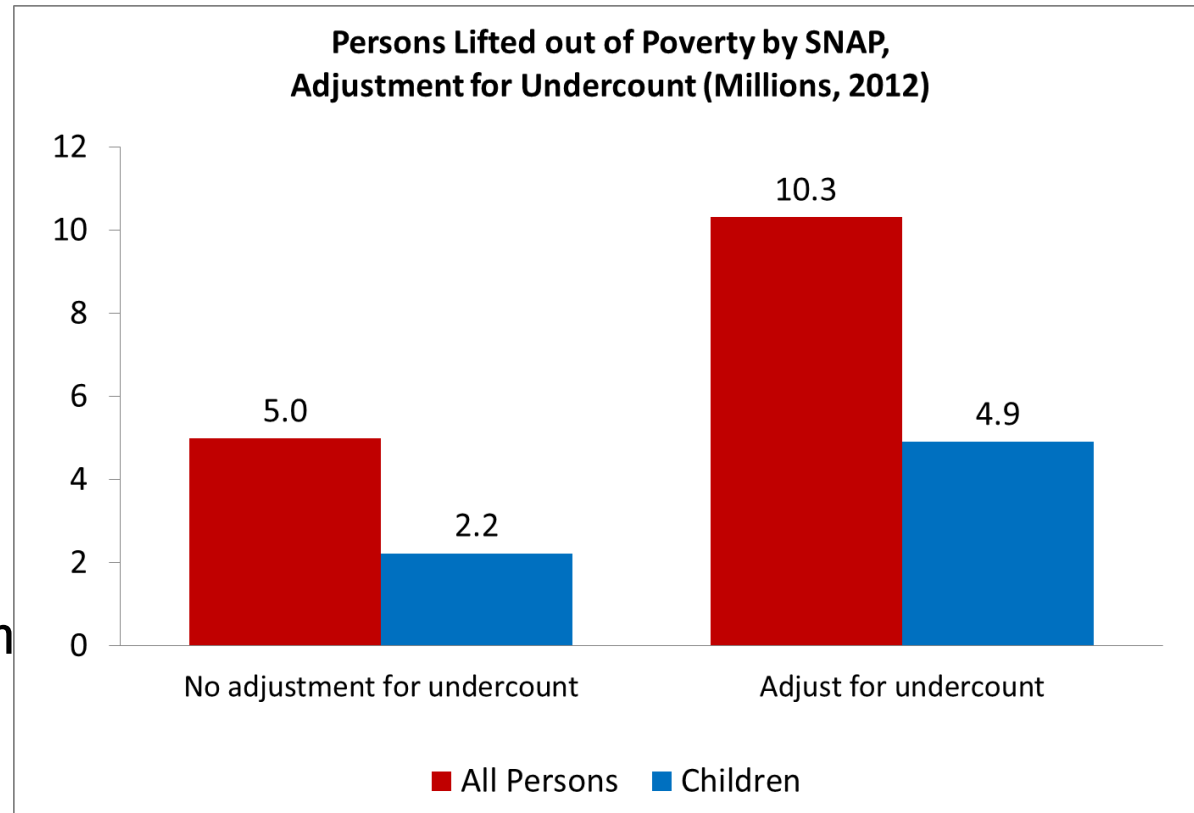
After the EITC, SNAP lifts more children out of poverty than any other program



Source: Calculations based on *Supplemental Poverty Measure, 2017* (Liana Fox), U.S. Department of Census, Current Population Report P60-265.

These (official) estimates are likely an undercount of the full effect of SNAP

Recent research shows substantial underreporting of SNAP as well as other transfers in household surveys (Meyer, Mok and Sullivan 2015, Meyer and Mittag 2015)



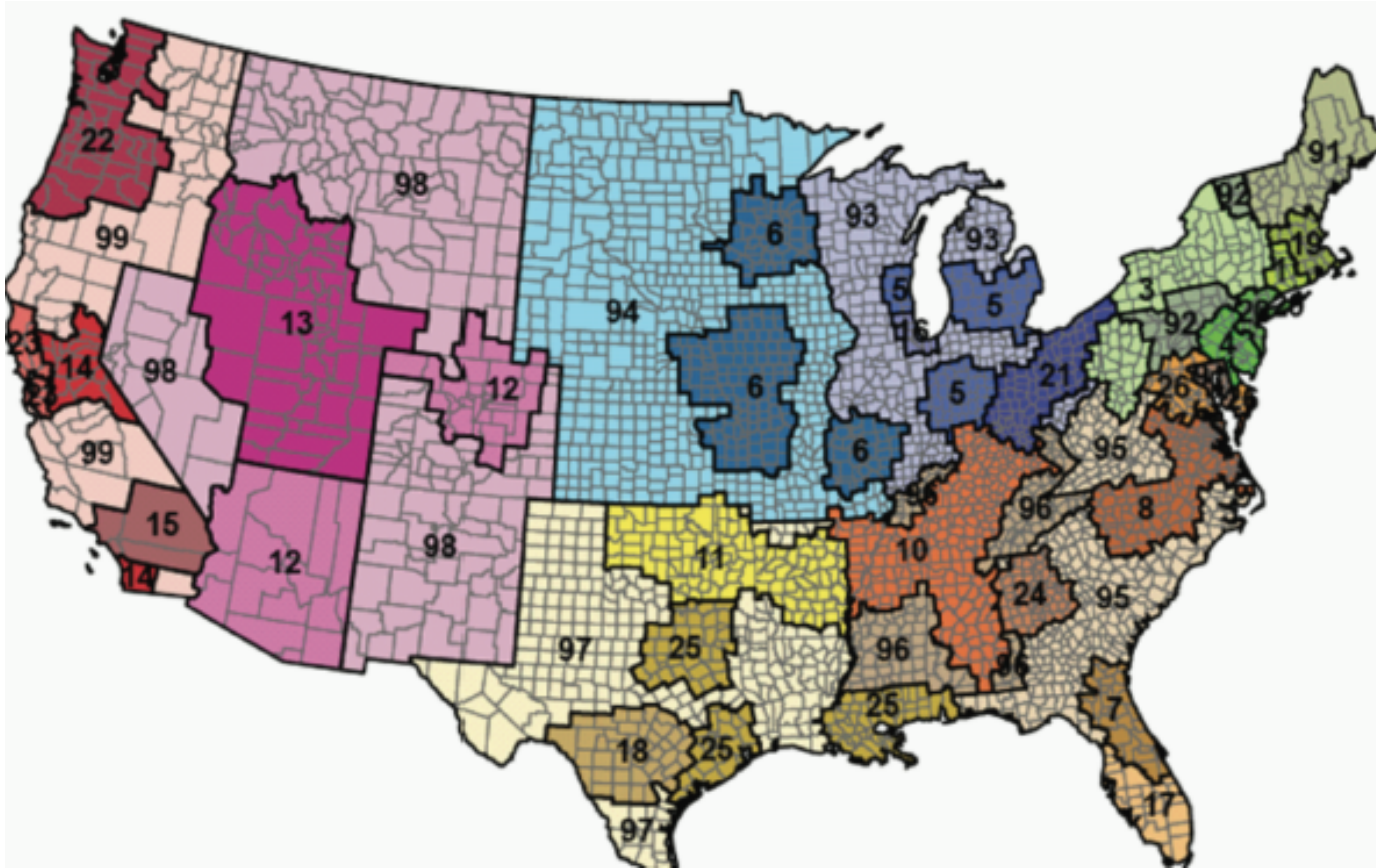
Source: Sherman and Trisi (2015).

2. SNAP Purchasing Power

Measuring SNAP purchasing power

- Thrifty Food Plan (TFP): food plan constructed by the USDA specifying foods that represent a nutritious diet at minimal cost.
- TFP is the basis for legislated maximum SNAP benefits.
- We use the Quarterly Food-at-Home Price Database (QFAHPD) to price out the cost of the TFP for each area and year
 - From Nielsen scanner data; provides quarterly estimates for 52 food categories for 35 regional market groups
 - We map the 52 food types in the QFAHPD into the 29 TFP food types using national expenditure shares following Gregory and Coleman-Jensen (2013)

Market Areas: 35 regional market groups



26 metro areas
9 non-metro
areas (or 4 non-
metro areas in
1999-2003)

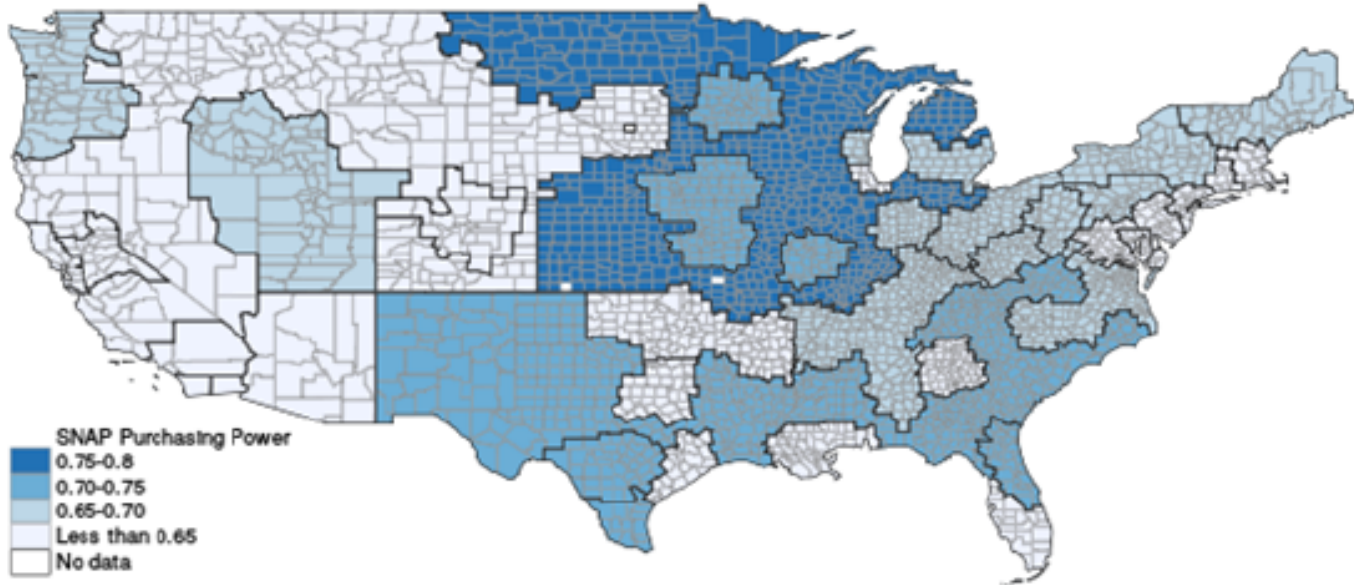
Each county is
fully contained in
one metro or
non-metro area

- SNAP purchasing power =

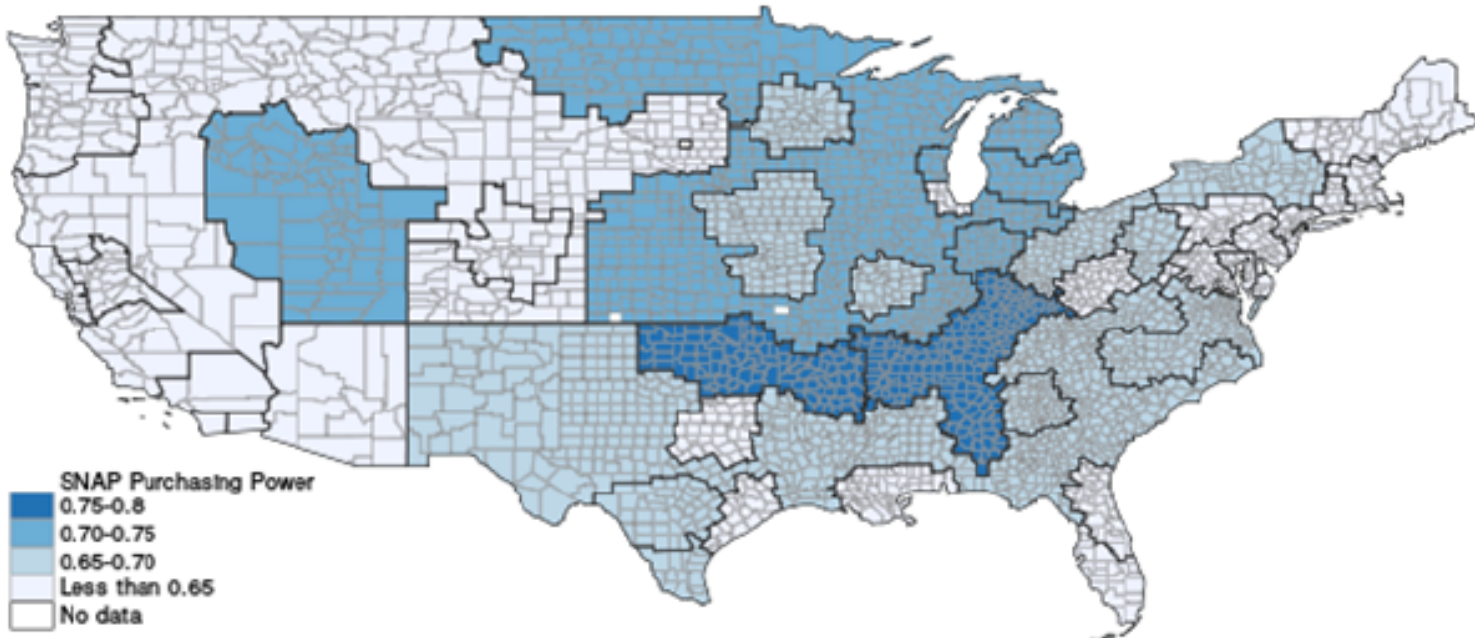
$$\frac{\text{Maxben fam of four}_t}{TFP_{rt}}$$

- QFAHPD for 1999-2010 for each market group r

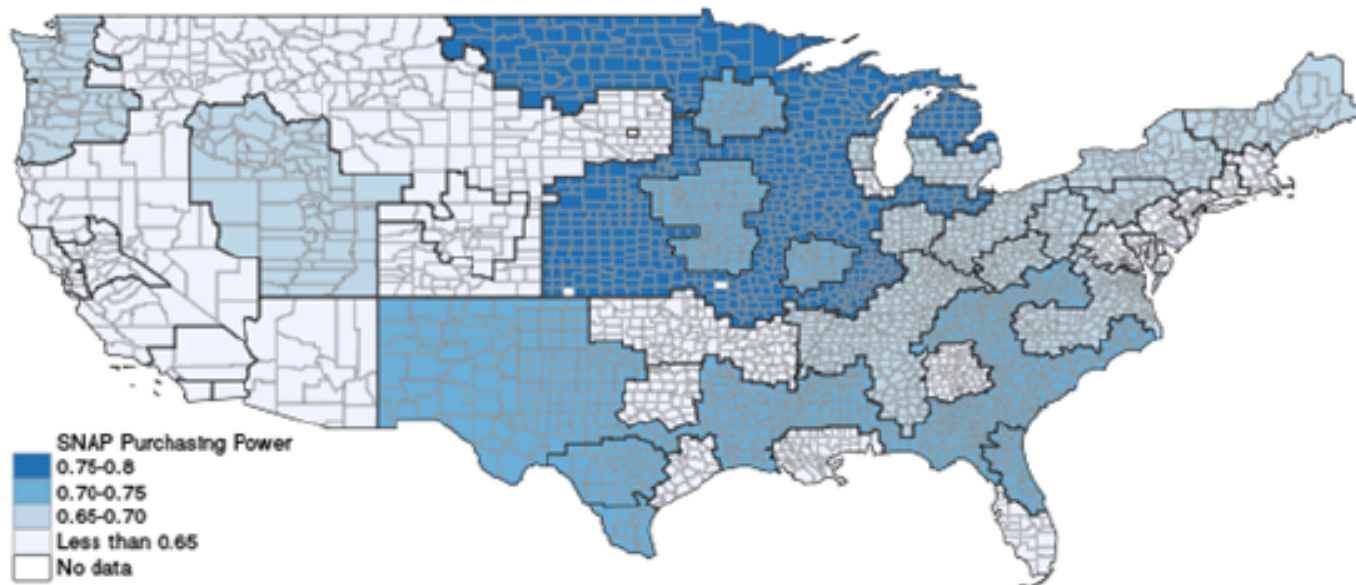
1999



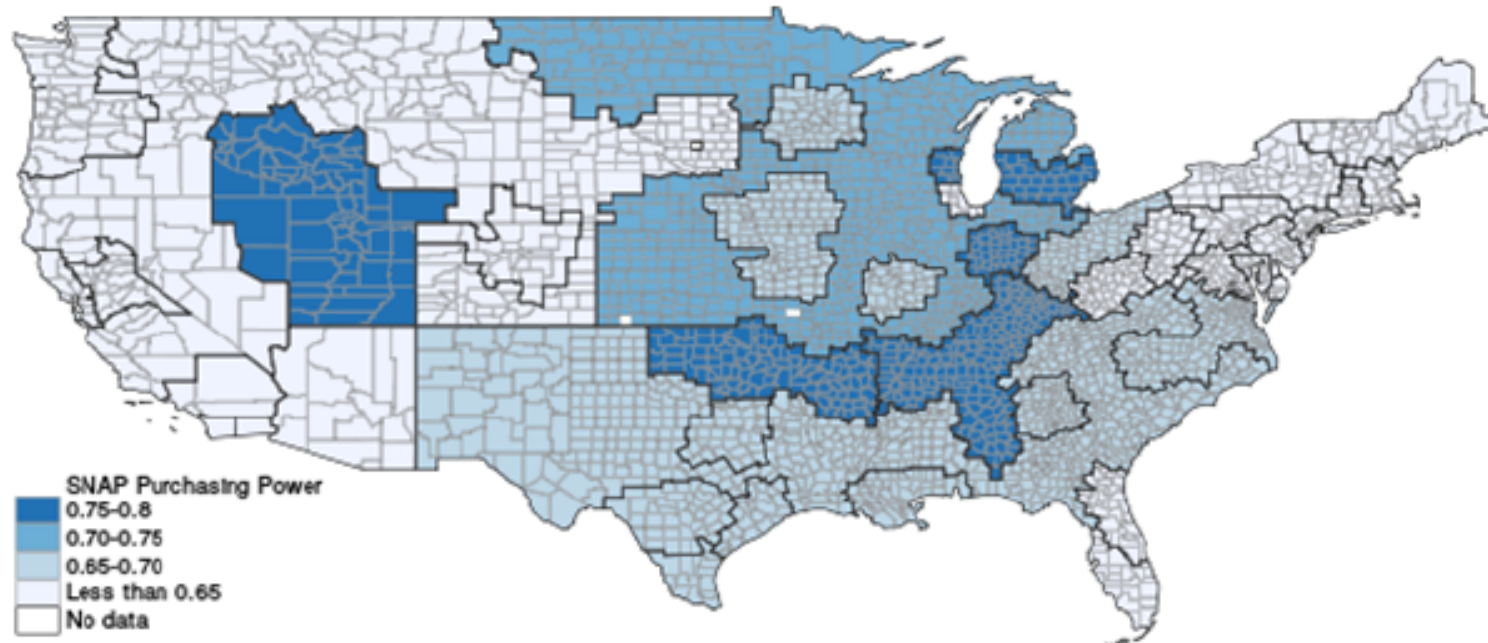
2008



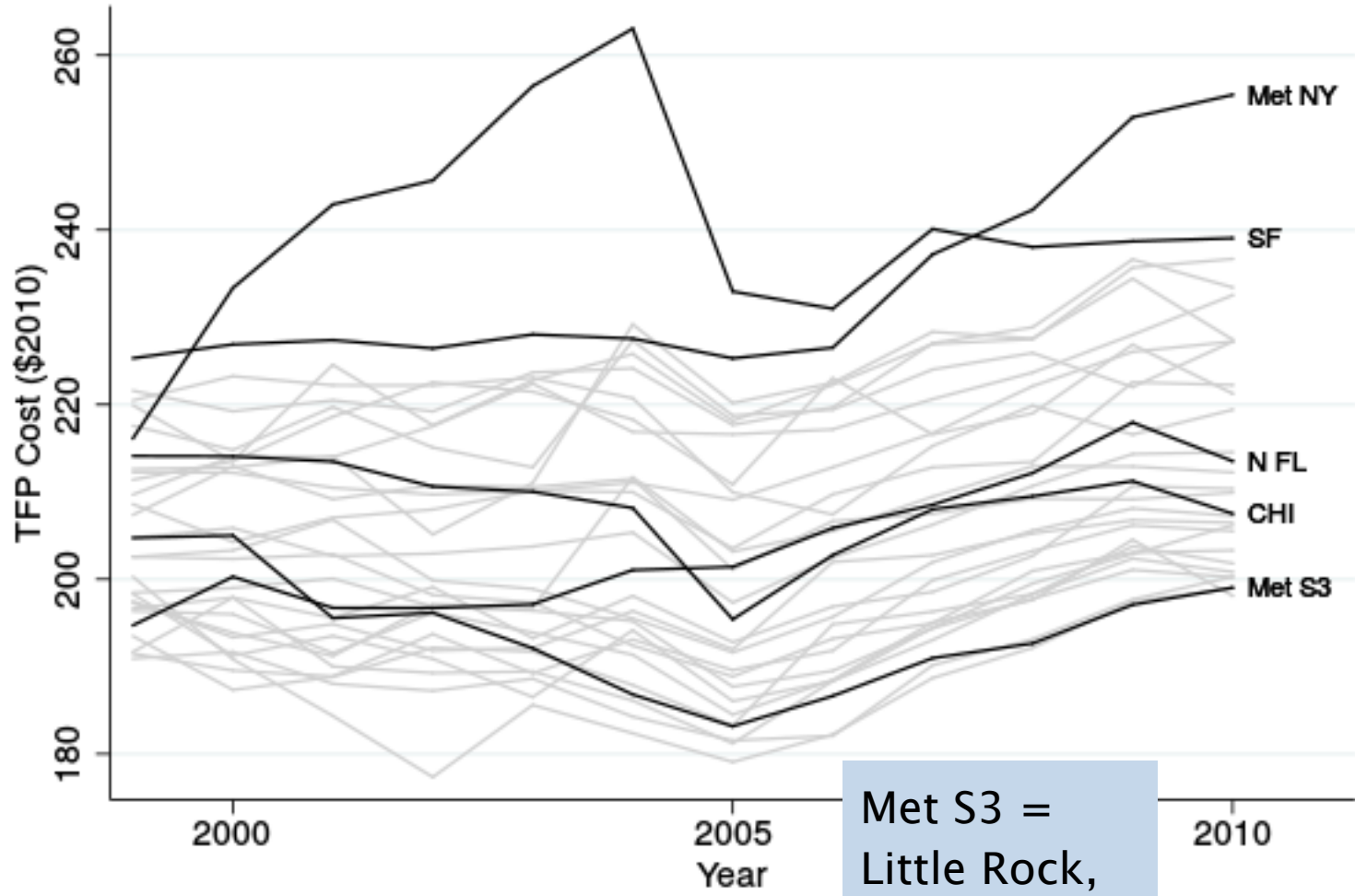
1999



2010

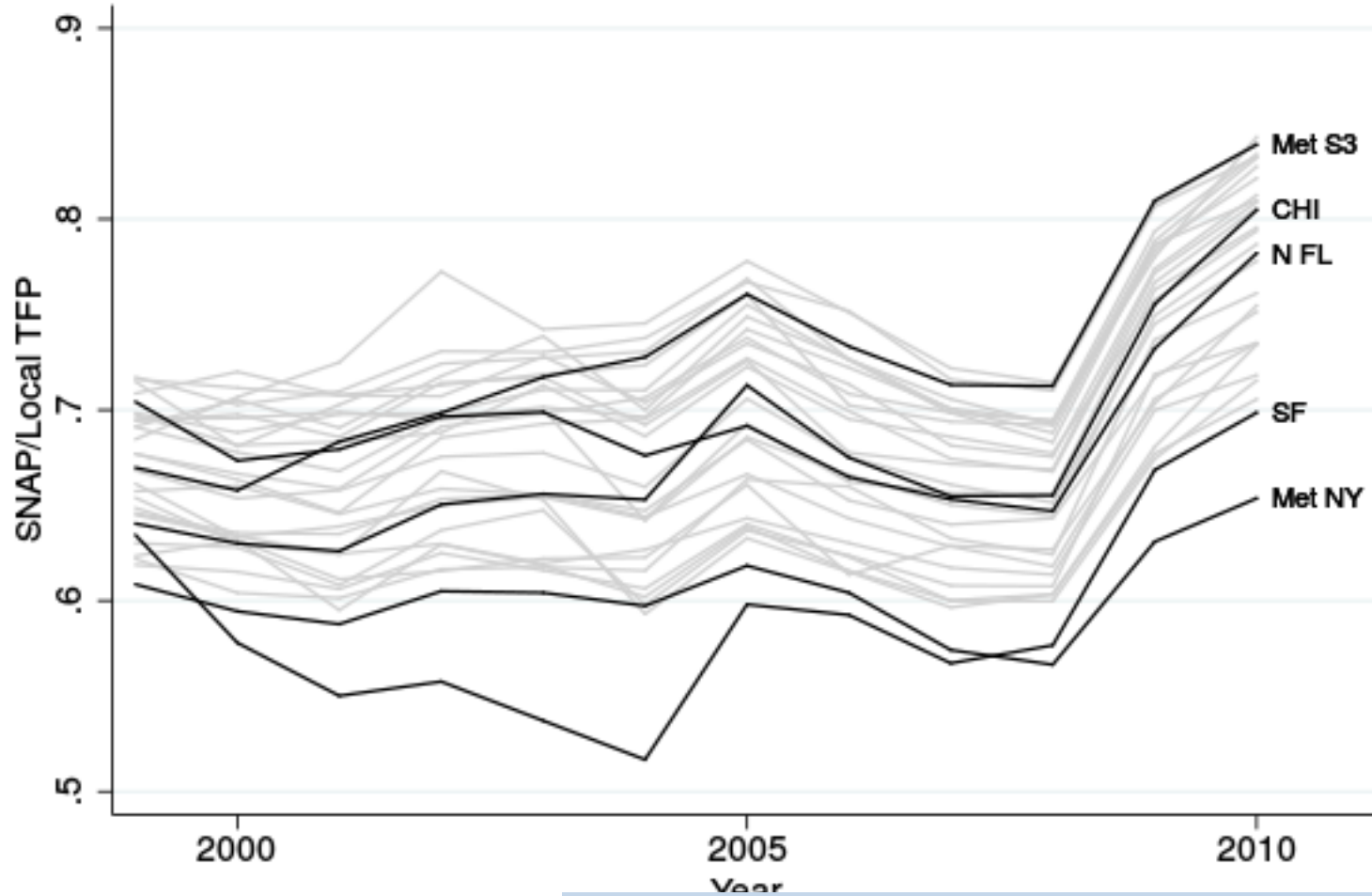


TFP Price, 1999-2010



Met S3 =
Little Rock,
metro OK

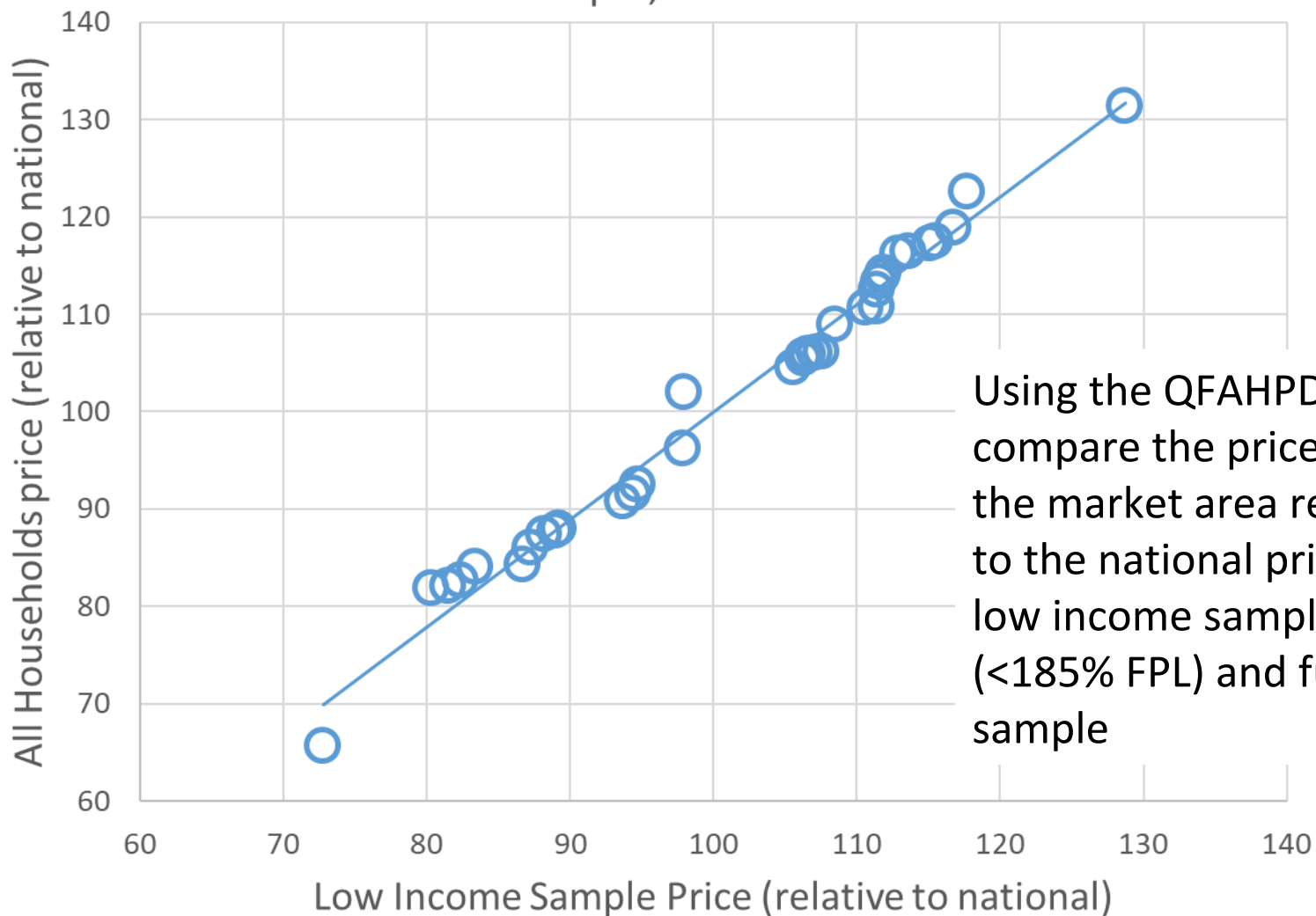
SNAP Purchasing Power, 1999-2010



Stimulus increase in SNAP max benefits in 2009-2010

- You will note that our ratio (SNAPBEN/TFP) is below 1 for all market areas–years.
- *Why do we underestimate the cost of the TFP?*
 - The USDA TFP is constructed by choosing quantities to meet nutritional guidelines at minimum cost (more canned tuna, less fresh fish).
 - QFAHPD prices and quantities are for all households
 - Low income families pay less per unit due to buying in bulk, on sale and buying private–labels
 - Low income families may purchase different items within category (e.g. more frozen vegetables)
- From what we have been able to measure, these differences are somewhat proportional and do not change the nature of the variation across markets that we use

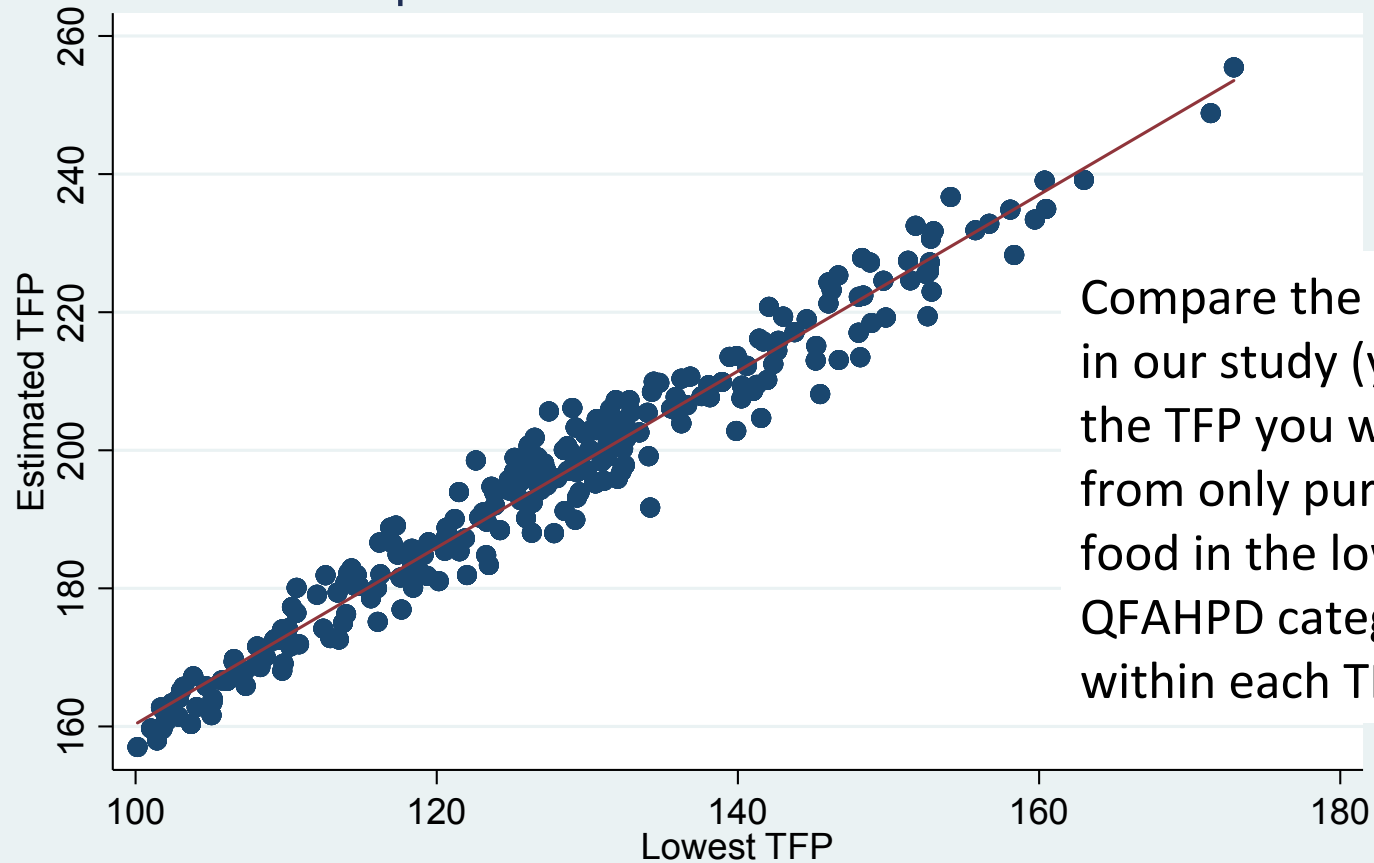
Price variation across market groups, full sample vs. low-income sample, low-fat milk



Note: National mean prices are weighted and calculated separately for each sample; low-income households have income less than 185% of the Federal poverty line. Calculated using Nielsen Homescan data 2006.

Source: Todd et al 2010, "Methodology Behind QFAHPD" USDA, ERS.

Relationship between estimated TFP and lowest TFP



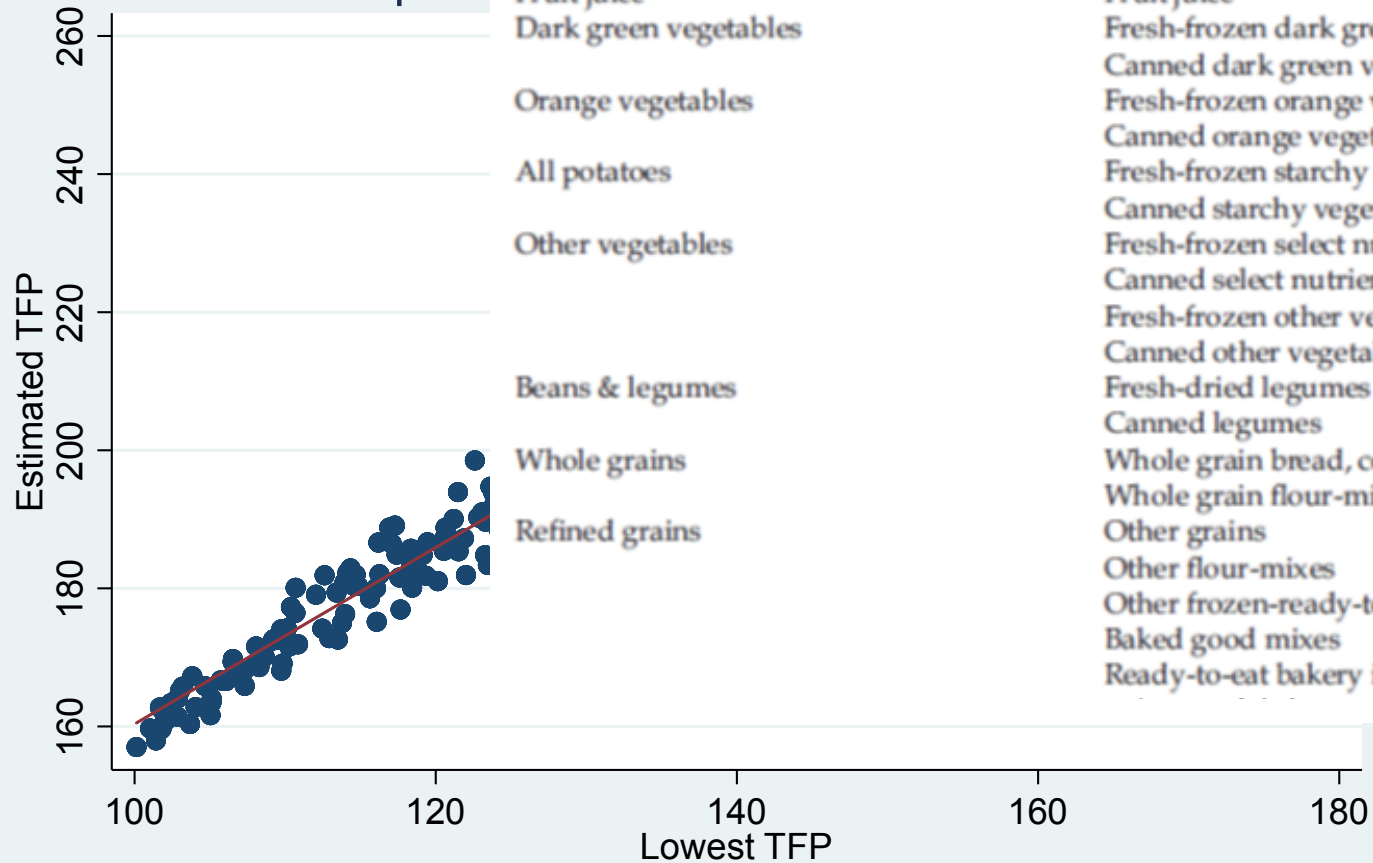
$$\text{TFP} = 32.583 + 1.278 * (\text{lowestTFP})$$

Compare the TFP we use in our study (y axis) to the TFP you would get from only purchasing food in the lowest cost QFAHPD categories within each TFP category.

Table A.1.1 TFP-QFAHPD Food Groups

TFP food	QFAHPD food(s)
Whole fruit	Fresh-frozen fruit Canned fruit
Fruit juice	Fruit juice
Dark green vegetables	Fresh-frozen dark green vegetables Canned dark green vegetables
Orange vegetables	Fresh-frozen orange vegetables Canned orange vegetables
All potatoes	Fresh-frozen starchy vegetables Canned starchy vegetables
Other vegetables	Fresh-frozen select nutrient vegetables Canned select nutrient vegetables Fresh-frozen other vegetables Canned other vegetables
Beans & legumes	Fresh-dried legumes Canned legumes
Whole grains	Whole grain bread, cereal, pasta Whole grain flour-mixes
Refined grains	Other grains Other flour-mixes Other frozen-ready-to-eat refined grains Baked good mixes Ready-to-eat bakery items

Relationship between



$$TFP = 32.583 + 1.278 * (\text{lowestTFP})$$

3. Empirical model and expected effects

Empirical model

- Relate child health outcome to SNAP purchasing power faced by household

$$y_{irt} = \alpha + \beta \ln \left(\frac{SNAPMAX_t}{TFP_{rt}} \right) + X_{irt}\theta + Z_{rt}\gamma + \delta_t + \lambda_r + \varepsilon_{irt}$$

- Fixed effects for market group r , time t , child and family characteristics X and state and local policy and economic variables Z .
- Cluster on market group r

Controls

- Child (age, race, ethnicity, gender) and family (family size, mom/dad presence and interaction with education, age, citizenship)
- State level policy variables:
 - SNAP ease of access (recertification length, call centers, online applications, etc.) from Ganong and Liebman (2015)
 - Other state safety net (EITC, minimum wage, TANF max ben, Medicaid/CHIP income eligibility)
- County / county group local prices & labor market conditions
 - County unemployment rate
 - County HUD fair market rent
 - Regional CPI for 8 non-food, non-housing categories (26 metro areas plus 16 region x county pop size groups)
- Robustness: Income, health status, insurance coverage

4. Data

National Health Interview Survey

- Annual health survey; 35,000 nationally representative households/year
- We use the 1999–2010 surveys
- We gain access to the restricted use data (through the Census RDC) to allow for identification of county of residence
- Some outcomes are only measured for the “sample child,” one child picked at random for more extensive further questions
- Main sample: citizen children 0–17 in families receiving SNAP; 44,627 children or 18,299 are “sample children”
 - Robustness: low educated unmarried mother sample shows qualitatively similar results

Outcomes and prediction (sign indicates expected effect of increase in SNAP purchasing power)

- • [“upstream”] Food insecurity
- + • Child routine health visits (check-up)
- • Forgo/delay care due to cost
- • Child health care (emergency room, hospitalization)
- + • Child health status: general report, obesity, mental health
- • Days child absent from school due to illness
- + • [mechanism] maternal mental health

5. Results

“Upstream” impacts

1. SNAP Caseload 1999–2010 (data source = USDA county data)
 - If SNAP caseload responds to SNAP purchasing power then this may lead to a composition bias (change in population that comes with change in prices)
2. Food insecurity (data source = Dec CPS Food Security Supplement CPS–FSS) *children in families on SNAP N=32,277 for 2001–2010*
 - Primary goal of food stamps is to reduce food insecurity
 - Proximate channel for effects

Table 2
Effect of SNAP Purchasing Power on Per-Capita SNAP Caseload

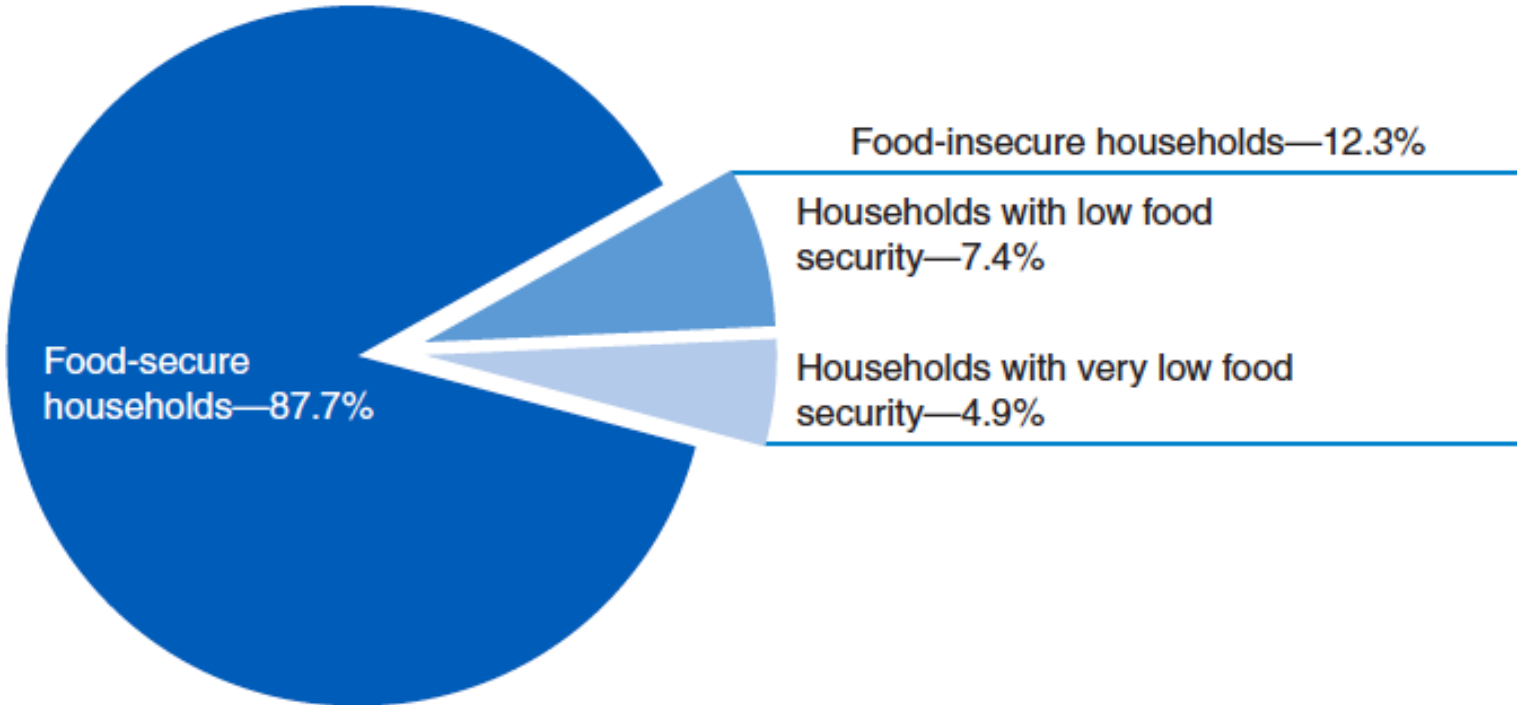
<i>Outcome = SNAP CASELOAD / POPULATION</i>	(1)	(2)	(3)	(4)	(5)
log(SNAPMax/TFP _t)	0.091** (0.036)	0.024 (0.089)	0.003 (0.088)	-0.004 (0.079)	0.010 (0.085)
Observations	37,277	37,277	37,277	37,177	37,177
R-squared	0.299	0.497	0.514	0.539	0.544
Mean	0.111	0.111	0.111	0.111	0.111
Effect of a 10% increase in SNAP purchasing power	0.0088	0.0023	0.0003	-0.0004	0.0010
Fixed effect for year, county	X	X	X	X	X
County UR		X	X	X	X
State SNAP and other policy controls			X	X	X
Regional price controls				X	X
Linear time trend	No	No	No	No	Yes

Notes: Data consists of county by year panel for 1999-2010. Results are weighted using county population. Standard errors in parentheses are corrected for clustering at the market group level; *** p<0.01, ** p<0.05, * p<0.1. All regressions include fixed effects for market group and year. Columns (2)-(6) add controls for local economic and policy variables: the county unemployment rate, an index of state SNAP policies (Ganong and Liebman, 2015), the state minimum wage, EITC, and Medicaid/SCHIP income eligibility limits, TANF generosity, as well as controls for HUD's fair market rent, and regional CPIs for non-food, non-housing categories (apparel, commodities, education, medical, recreation, services, transportation and other goods and services).

Encouraging – no significant impacts on SNAP participation.
Not sensitive to controls (after adding UR)
Going forward, column (4) is our main specification.

USDA defines food insecurity to be the condition when access to adequate food is limited by a lack of income and other resources.

Figure 1
U.S. households by food security status, 2016



Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, 2016 Current Population Survey Food Security Supplement.

Food Insecurity – measurement

10 questions asked of all households

Questions Used To Assess the Food Security of Households In the CPS Food Security Survey

1. “We worried whether our food would run out before we got money to buy more.” Was that often, sometimes, or never true for you in the last 12 months?
2. “The food that we bought just didn’t last and we didn’t have money to get more.” Was that often, sometimes, or never true for you in the last 12 months?
3. “We couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for you in the last 12 months?
4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn’t enough money for food? (Yes/No)
5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
6. In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money for food? (Yes/No)
7. In the last 12 months, were you ever hungry, but didn’t eat, because there wasn’t enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because there wasn’t enough money for food? (Yes/No)
9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food? (Yes/No)
10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

Household measures
Low Food Security =
answer YES to 3+
questions
Very Low Food Security =
answer YES to 8+
questions

Food Insecurity – measurement

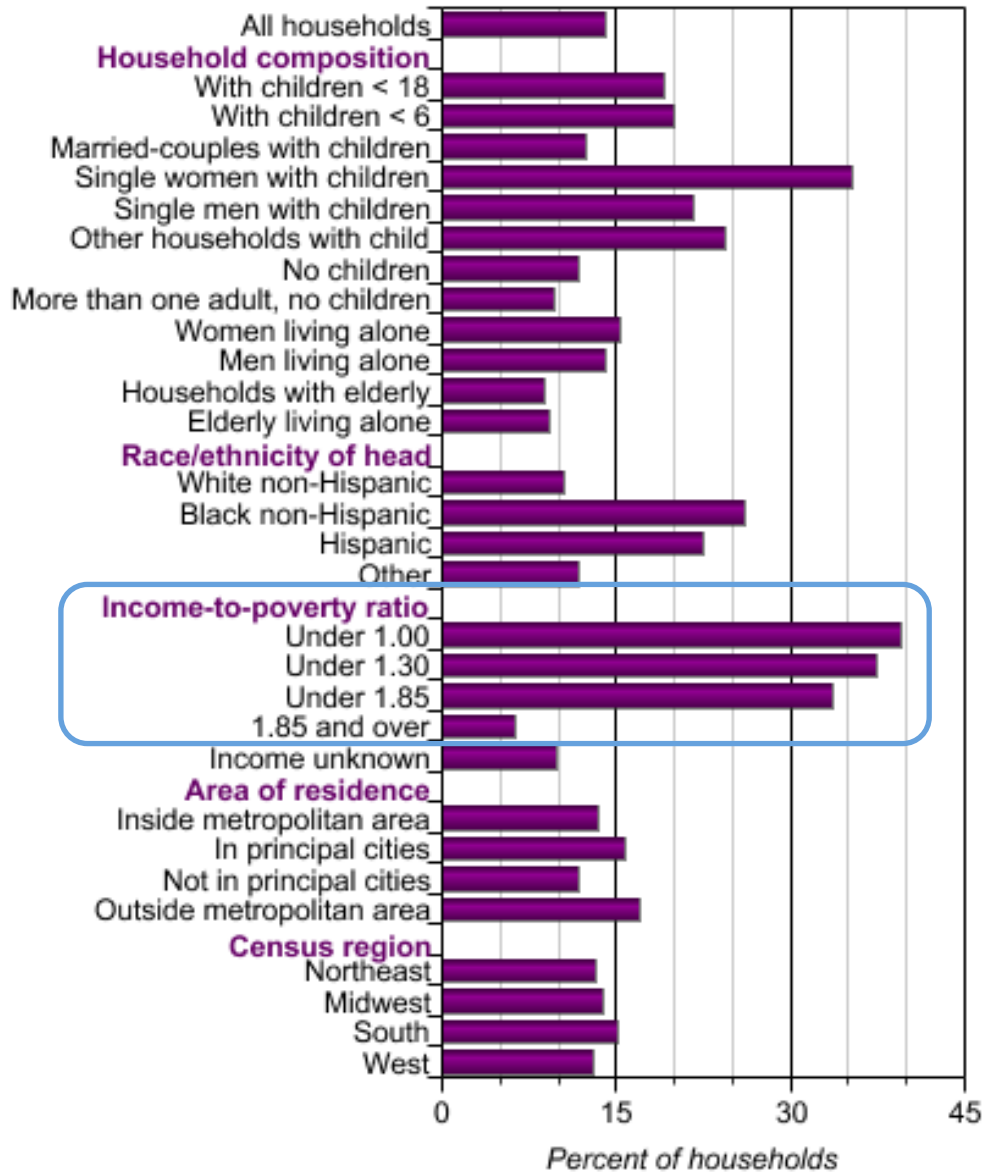
8 questions asked of households with children

(Questions 11-18 were asked only if the household included children age 0-17)

11. “We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food.” Was that often, sometimes, or never true for you in the last 12 months?
12. “We couldn’t feed our children a balanced meal, because we couldn’t afford that.” Was that often, sometimes, or never true for you in the last 12 months?
13. “The children were not eating enough because we just couldn’t afford enough food.” Was that often, sometimes, or never true for you in the last 12 months?
14. In the last 12 months, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food? (Yes/No)
15. In the last 12 months, were the children ever hungry but you just couldn’t afford more food? (Yes/No)
16. In the last 12 months, did any of the children ever skip a meal because there wasn’t enough money for food? (Yes/No)
17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
18. In the last 12 months did any of the children ever not eat for a whole day because there wasn’t enough money for food? (Yes/No)

Child measures
Low Food Security among children = answer YES to 2+ questions
Very Low Food Security among children = answer YES to 5+ questions

Prevalence of food insecurity, 2014



Higher rates of food insecurity among:

- Children, racial and ethnic minorities

Economic resources are a particularly strong determinant of food insecurity

Table 5

Effects of SNAP Purchasing Power on Food Insecurity

Sample: SNAP Recipient U.S. Citizen Children in the December CPS, 2001-2010

	(1) Child is food insecure	(2) Child is very food insecure
$\log(\text{SNAPMax}/\text{TFP}_t)$	-0.670* [0.330]	0.0856 [0.107]
Mean of dep. var.	0.293	0.041
Effect of 10% increase in SNAP purchasing power	-0.0639	0.00816
As a % of mean of dep. var.	-21.8%	19.9%
N	29,324	29,324
R ²	0.033	0.021

SNAP reduces food insecurity.

Probably makes sense that it doesn't affect the much more extreme outcome of very low food security.

Downstream: impacts on health

Table 3
 Effects of Variation in SNAP Purchasing Power on Children's Health Care Utilization
Sample: SNAP Recipient U.S. Citizen Children in the NHIS, 1999-2010

	Children in Sample Child File			All Children
	Had a checkup past 12m	Doctor's visit past 12m	Any ER visit past 12m	Delay or forgo care past 12m
log(SNAPMAX/TFP)	0.656*** (0.225)	0.323** (0.147)	-0.178 (0.215)	-0.089 (0.092)
Mean of dep. var.	0.77	0.901	0.315	0.051
Effect of 10% increase in SNAP purchasing power	0.063	0.031	-0.017	-0.009
As a % of mean of dep. var.	8.1%	3.4%	-5.4%	-16.6%
N	18,169	18,108	18,217	44,626
R ²	0.077	0.038	0.046	0.022

Higher SNAP purchasing power lead to more preventative care (checkup).
 No significant effects on ER visits or delay/forgo care (though signs are as expected)

Table 4
 Effects of Variation in SNAP Purchasing Power on Children's Health Outcomes
Sample: SNAP Recipient U.S. Citizen Children in the NHIS, 1999-2010

	Children in Sample Child File				All NHIS Children 0-17	
	School days missed due to illness	5 or more school days missed	Obese	Emotional problem	Health status excellent or very good	Hospitalized overnight past 12m
log(SNAPMAX/TFP)	-11.43** (5.374)	-0.148 (0.272)	-0.24 (0.374)	0.055 (0.468)	-0.121 (0.199)	0.02 (0.065)
Mean of dep. var.	4.955	0.332	0.199	0.464	0.700	0.075
Effect of 10% increase in SNAP purch power	-1.090	-0.014	-0.023	0.005	-0.012	0.002
As a % of mean of dep. var.	-22.0%	-4.2%	-11.5%	1.1%	-1.6%	2.6%
N	11420	11420	4471	10779	44,627	44,620
R2	0.033	0.041	0.035	0.055	0.032	0.150
<i>Subsample for question</i>	Ages 5+	Ages 5+	Ages 12-17	Ages 4+	All	All

Robust effect for school days missed; similar to East (2016)
 Would not expect obesity to adjust with year-to-year variation in the design [note different samples for different outcomes]

Evidence on mechanisms (or ruling out other channels for effects)

- No significant effect on health insurance coverage (expected since most children on SNAP also get Medicaid) [Table 6]
- Take-up of other food and nutrition programs (WIC, school breakfast, school lunch) does not respond to SNAP purchasing power
- Add controls for possible pathways income, health insurance, health status (possibly endogenous) [Appendix Table 3-4], makes little difference
- No significant effects on maternal mental health [proxy for stress / bandwidth channel]

Table 6
 Effects of SNAP Purchasing Power on Health Insurance Coverage
Sample: SNAP Recipient U.S. Citizen Children in the NHIS, 1999-2010

	All NHIS Children
	<u>No Insurance</u>
$\log(\text{SNAPMax}/\text{TFP}_t)$	-0.071 (0.136)
Mean of dep. var.	0.067
Effect of 10% increase in SNAP purchasing power	-0.007
As a % of mean of dep. var.	-10.1%
N	44,540
R ²	0.033

No impact on health insurance coverage
 (and as expected very small share are not covered)

Effect of SNAP Purchasing Power on Child Enrollment in other food and nutrition programs

Appendix Table 4
 Effects of SNAP Purchasing Power on Other Program Participation
 Sample: SNAP Recipient U.S. Citizen Children in the December CPS, 2001-2010

	(1) [Ages 0-5] WIC	(2) [Ages 5-17] School Breakfast	(3) [Ages 5-17] School Lunch
$\log(\text{SNAPMax}/\text{TFP}_t)$	0.199 (0.493)	0.295 (0.566)	0.360 (0.332)
Mean of dep. var.	0.597	0.719	0.878
Effect of 10% increase in SNAP purchasing power	0.019	0.028	0.034
As a % of mean of dep. var.	3.2%	3.9%	3.9%
N	9,713	19,171	19,244
R ²	0.096	0.082	0.058

Notes: Results from weighted OLS regressions. Standard errors in parentheses are corrected for clustering at the market group level; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Validity of design and placebo

- Adding a lead of $\ln(\text{SNAP}/\text{price})$; qualitatively similar findings [Table 8A]
- Adding market group linear trends; signs are robust but standard errors increase [Table 8B]
- Generally insignificant effects on a higher income sample [Table 7]

Effects of SNAP Purchasing Power on Health Care Utilization and Health: Robustness Checks
 Sample: SNAP-Recipient U.S. Citizen Children, 1999-2010

Robustness Check	A. Health Care Utilization				B. Health Outcomes					
	Children in Sample Child File			All Children	Children in Sample Child File				All Children	
	Had checkup	Doctor's visit	Any ER visit	Delay or forgo care	School days missed	5+ school days missed	Obese	Emotional problem	Health status exc or v good	Hosp. overnight
A. Include lead term using future TFP price										
log(SNAPMax/TFP _t)	0.517*	0.111	0.011	0.040	-13.48**	-0.161	-0.273	0.003	-0.065	0.043
	(0.278)	(0.161)	(0.308)	(0.089)	(5.90)	(0.327)	(0.535)	(0.774)	(0.305)	(0.060)
log(SNAPMax/TFP _{t+1})	0.194	0.260	-0.386	-0.185*	-4.756	-0.303	0.0717	0.266	-0.155	-0.076
	(0.247)	(0.192)	(0.238)	(0.097)	(4.02)	(0.295)	(0.473)	(0.792)	(0.316)	(0.089)
Mean of dep. var.	0.764	0.900	0.312	0.054	4.981	0.333	0.201	0.459	0.697	0.075
N	15,874	15,821	15,916	39,070	9,971	9,971	3,897	9,164	39,070	39,063
R ²	0.082	0.039	0.049	0.023	0.036	0.043	0.039	0.058	0.032	0.153
Base case results	0.656***	0.323**	-0.178	-0.089	-11.43**	-0.148	-0.24	0.055	-0.121	0.020
	(0.225)	(0.147)	(0.215)	(0.092)	(5.374)	(0.272)	(0.374)	(0.468)	(0.199)	(0.065)

Table 8A

Exploring the validity of the design – adding a lead of
 ln(SNAP/price)
 Qualitatively similar findings.

Table 8
 Effects of SNAP Purchasing Power on Health Care Utilization and Health: Robustness Checks
 Sample: SNAP-Recipient U.S. Citizen Children, 1999-2010

Robustness Check	A. Health Care Utilization				B. Health Outcomes						
	Children in Sample Child File			All Children	Children in Sample Child File				All Children		
B. Include market group-level linear time trends											
	Had checkup	Doctor's visit	Any ER visit	Delay or forgo care	School days missed	5+ school days missed	Obese	Emotional problem	Health status exc or v good	Hosp. overnight	
log(SNAPMax/TFP _t)	0.268 (0.272)	0.148 (0.196)	0.0724 (0.315)	-0.0316 (0.116)	-12.53* (6.82)	-0.018 (0.289)	-0.351 (0.433)	-0.098 (0.671)	-0.228 [0.248]	0.0775 [0.0637]	
Mean of dep. var.	0.770	0.901	0.315	0.051	4.955	0.332	0.199	0.464	0.70	0.07	
Effect of 10% increase in SNAP PP	0.026	0.014	0.007	-0.003	-1.194	-0.002	-0.034	-0.009	-0.02	0.01	
As a % of mean of dep. var.	3.3%	1.6%	2.2%	-5.9%	-24.1%	-0.5%	-16.8%	-2.0%	-3.1%	9.9%	
Base case results	0.656*** (0.225)	0.323** (0.147)	-0.178 (0.215)	-0.089 (0.092)	-11.43** (5.374)	-0.148 (0.272)	-0.24 (0.374)	0.055 (0.468)	-0.121 (0.199)	0.020 (0.065)	

Table 8B
 Adding region x linear time trends.
 Probably not a valid specification
 given nonlinearity of SNAP purchasing
 power.

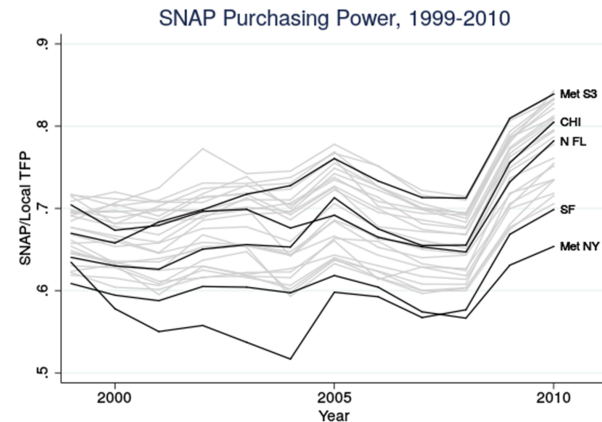


Table 7

Effects of SNAP Purchasing Power on Health Care Utilization and Health: Robustness Checks

Sample: U.S. Citizen Children in NHIS with Household Incomes between 300 and 450 Percent of Federal Poverty Line, 1999-2010

	A. Health Care Utilization				B. Health Outcomes					
	Children in Sample Child File			All Children	Children in Sample Child File				All Children	
	Had checkup	Doctor's visit	Any ER visit	Delay or forgo care	School days missed	5+ school days missed	Obese	Emotional problem	Health status exc or v good	Hosp. overnight
$\log(\text{SNAPMax}/\text{TFP}_t)$	0.232 (0.208)	0.190 (0.125)	-0.300** (0.116)	-0.058 (0.044)	2.07 (3.14)	-0.095 (0.151)	0.420** (0.159)	0.285 (0.275)	0.012 (0.104)	-0.013 (0.045)
Mean of dep. var.	0.756	0.911	0.175	0.030	3.360	0.241	0.113	0.239	0.886	0.054
Effect of 10% increase in SNAP PP	0.022	0.018	-0.029	-0.006	0.197	-0.009	0.040	0.027	0.001	-0.001
As a % of mean of dep. var.	2.9%	2.0%	-16.3%	-18.6%	5.9%	-3.7%	35.4%	11.3%	0.1%	-2.3%
N	24,898	24,887	25,025	48,616	18,189	18,189	8,879	15,644	48,637	48,607
R ²	0.092	0.035	0.02	0.01	0.022	0.020	0.042	0.030	0.023	0.176
Base case results	0.656*** (0.225)	0.323** (0.147)	-0.178 (0.215)	-0.089 (0.092)	-11.43** (5.374)	-0.148 (0.272)	-0.24 (0.374)	0.055 (0.468)	-0.121 (0.199)	0.020 (0.065)

Table 7

Placebo sample: Higher income children

Other sensitivity checks

- To address concerns of multiple hypothesis testing, we estimate impacts on index [App Table 5]
- Alternative sample: children of unmarried low educated parents [Table 8, panel C]
- Include non-citizen children [App Tab 1-2], estimates a bit smaller as expected

Appendix Table 5
Summary Index Estimates

VARIABLES	(1) Utilization SNAP Citizen	(3) Utilization Low-Ed Unmarried	(4) Outcomes SNAP Citizen	(5) Outcomes Low-Ed Unmarried
log(SNAPMax/TFPYRM)	4.229** [1.542]	4.469*** [1.264]	1.336 [0.847]	2.345* [1.155]
Observations	17,985	17,560	11,413	12,371
R-squared	0.052	0.060	0.027	0.023
Mean of dep. variable	-0.00484	0.00247	0.167	0.174
Effect of 10% increase	0.403	0.426	0.127	0.223

Notes: Table features coefficients from summary index estimates for health care utilization variable (checkups, any doctor visits, delay seeking health care, ER visit, and no health insurance) or for health outcome variables (health status, hospitalization, and school days missed). Variables are standard normalized and sums, so coefficient represents standard deviation units. All observations are from the Sample Child file, and the exact sample is either citizen SNAP children or children with low-education unmarried parents.

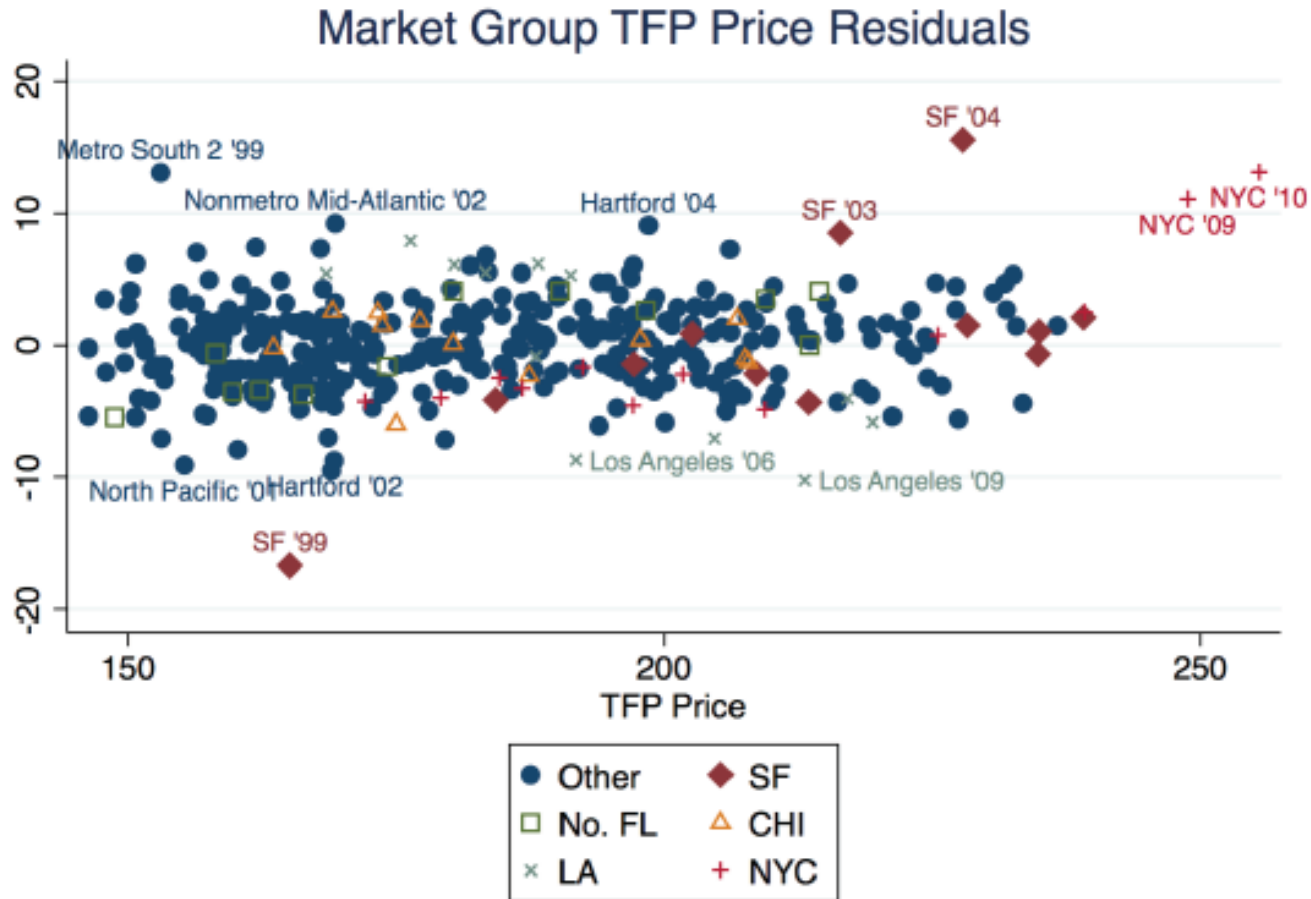
App Table 5

Multiple outcome index – SNAP leads to more preventative and ambulatory care; effect on health outcomes is positive but statistically insignificant.

Conclusion

- We make a contribution by examining a new source of variation to identify the effects of SNAP
- Substantive finding that lower purchasing power leads to more school absences, higher food insecurity and less preventative health care.
- Summary index shows that SNAP leads to more preventative and ambulatory care
- Demonstrates the benefits of this core element of the social safety net
- SNAP survived welfare reform in the 1990s intact but many current proposals for cutting back the program: converting to a block grant, adding work requirements
- Going forward, there is scope for other analyses to take advantage of this local price variation to identify the effects of SNAP

EXTRA SLIDES



RESIDUALS OF TFP ON FE FOR AREA, TIME AND OTHER AREA PRICES
 Shows significant residual variation
 No systematic patterns for area (SF, NYC, LA labeled)

Effects of SNAP Purchasing Power on Health Care Utilization and Health: Robustness Checks

Sample: SNAP-Recipient U.S. Citizen Children, 1999-2010

Robustness Check	A. Health Care Utilization				B. Health Outcomes					
	Children in Sample Child File		All Children		Children in Sample Child File			All Children		
C. Alternate Sample: Children of Low-Educated, Unmarried Parents	Had checkup	Doctor's visit	Any ER visit	Delay or forgo care	School days missed	5+ school days missed	Obese	Emotional problem	Health status exc or v good	Hosp. overnight
log(SNAPMax/TFP _t)	0.640** (0.255)	0.100 (0.161)	-0.505** (0.184)	0.013 (0.086)	-11.68 (7.93)	-0.011 (0.194)	0.210 (0.344)	-0.305 (0.427)	0.058 (0.195)	-0.047 (0.053)
Mean of dep. var.	0.726	0.867	0.279	0.057	4.323	0.305	0.181	0.396	0.705	0.062
Effect of 10% increase in SNAP PP	0.061	0.010	-0.048	0.001	-1.113	-0.001	0.020	-0.029	0.006	-0.005
As a % of mean of dep. var.	8.4%	1.1%	-17.3%	2.1%	-25.7%	-0.3%	11.0%	-7.3%	0.8%	-7.2%

Table 8C

Alternative sample: all children living with unmarried parents with less than a college degree

Possible concern that SNAP recipient sample changes with local prices (though caseload analysis suggests it is not)

	A. Health Care Utilization				B. Health Outcomes					
	Children in Sample Child File			All Children	Children in Sample Child File				All NHIS Children 0-17	
	Had a checkup past 12m	Doctor's visit past 12m	Any ER visit past 12m	Delay or forgo care past 12m	School days missed due to illness	5 or more school days missed	Obese	Emotional problem	Health status excellent or very good	Hospitalized overnight past 12m
log(SNAPMAX/TFP)	0.641*** (0.227)	0.288* (0.151)	-0.158 (0.223)	-0.094 (0.089)	-11.10** (5.23)	-0.157 (0.263)	-0.190 (0.341)	0.048 (0.455)	-0.152 (0.193)	0.021 (0.062)
Mean of dep. var.	0.764	0.896	0.311	0.053	4.87	0.326	0.196	0.452	0.699	0.073
Effect of 10% increase in SNAP purchasing power	0.061	0.028	-0.015	-0.009	-1.60	-0.015	-0.018	-0.005	-0.015	0.002
As a % of mean of dep. var.	8.0%	3.1%	-4.8%	-17.0%	-32.9%	-4.6%	-9.2%	-1.1%	-2.1%	2.7%
N	18,765	18,699	18,815	46,358	11,953	11,953	4,740	11,252	46,359	46,354
R ²	0.082	0.044	0.047	0.021	0.034	0.044	0.034	0.058	0.031	0.148
Base case results	0.656*** (0.225)	0.323** (0.147)	-0.178 (0.215)	0.469 (0.341)	-11.43** (5.374)	-0.148 (0.272)	-0.24 (0.374)	0.055 (0.468)	-0.121 (0.199)	0.020 (0.065)

App Tables 1-2

All children (including noncitizens)

As expected estimates are a bit smaller (reflecting lower overall eligibility rates)

Appendix Table 1
 Effects of Variation in SNAP Purchasing Power on Children's Health Care Utilization
 Adding controls for income, parental insurance and health status
Sample: SNAP Recipient U.S. Citizen Children in the NHIS, 1999-2010

	Children in Sample Child File			All Children
	Had a checkup past 12m	Doctor's visit past 12m	Any ER visit past 12m	Delay or forgo care past 12m
log(SNAPMAX/TFP)	0.648*** (0.223)	0.301** (0.146)	-0.230 (0.207)	-0.084 (0.085)
Mean of dep. var.	0.770	0.901	0.315	0.051
Effect of 10% increase in SNAP purchasing power	0.062	0.029	-0.022	-0.008
As a % of mean of dep. var.	8.1%	3.2%	-7.0%	-15.7%
N	18,126	18,065	18,171	44,504
R ²	0.087	0.052	0.063	0.097
Base case results	0.656*** (0.225)	0.323** (0.147)	-0.178 (0.215)	-0.089 (0.092)

App Table 1 (and App Table 2)
 Adding (possibly endogenous) controls: family income,
 health insurance, health status

Appendix Table 2
 Effects of Variation in SNAP Purchasing Power on Children's Health Outcomes
 Adding controls for income, parental insurance and health status
 Sample: SNAP Recipient U.S. Citizen Children in the NHIS, 1999-2010

	Children in Sample Child File				All NHIS Children 0-17	
	School days missed due to illness	5 or more school days missed	Obese	Emotional problem	Health status excellent or very good	Hospitalized overnight past 12m
log(SNAPMAX/TFP)	-12.16** (5.57)	-0.179 (0.257)	-0.338 (0.380)	-0.008 (0.436)	-0.140 (0.196)	0.021 (0.065)
Mean of dep. var.	4.96	0.332	0.199	0.463	0.700	0.075
Effect of 10% increase in SNAP purch power	-1.16	-0.017	-0.032	-0.001	-0.013	0.002
As a % of mean of dep. var.	-23.4%	-5.1%	-16.1%	-0.2%	-1.9%	2.7%
N	11420	11420	4471	10779	44,627	44,620
R2	0.033	0.041	0.035	0.055	0.034	0.150
Base Case results	-11.43** (5.374)	-0.148 (0.272)	-0.24 (0.374)	0.055 (0.468)	-0.121 (0.199)	0.020 (0.065)

App Table 2
 Adding (possibly endogenous) controls: family income, health insurance, health status