"Inside the War on Poverty: The Impact of Food Stamps on Health"

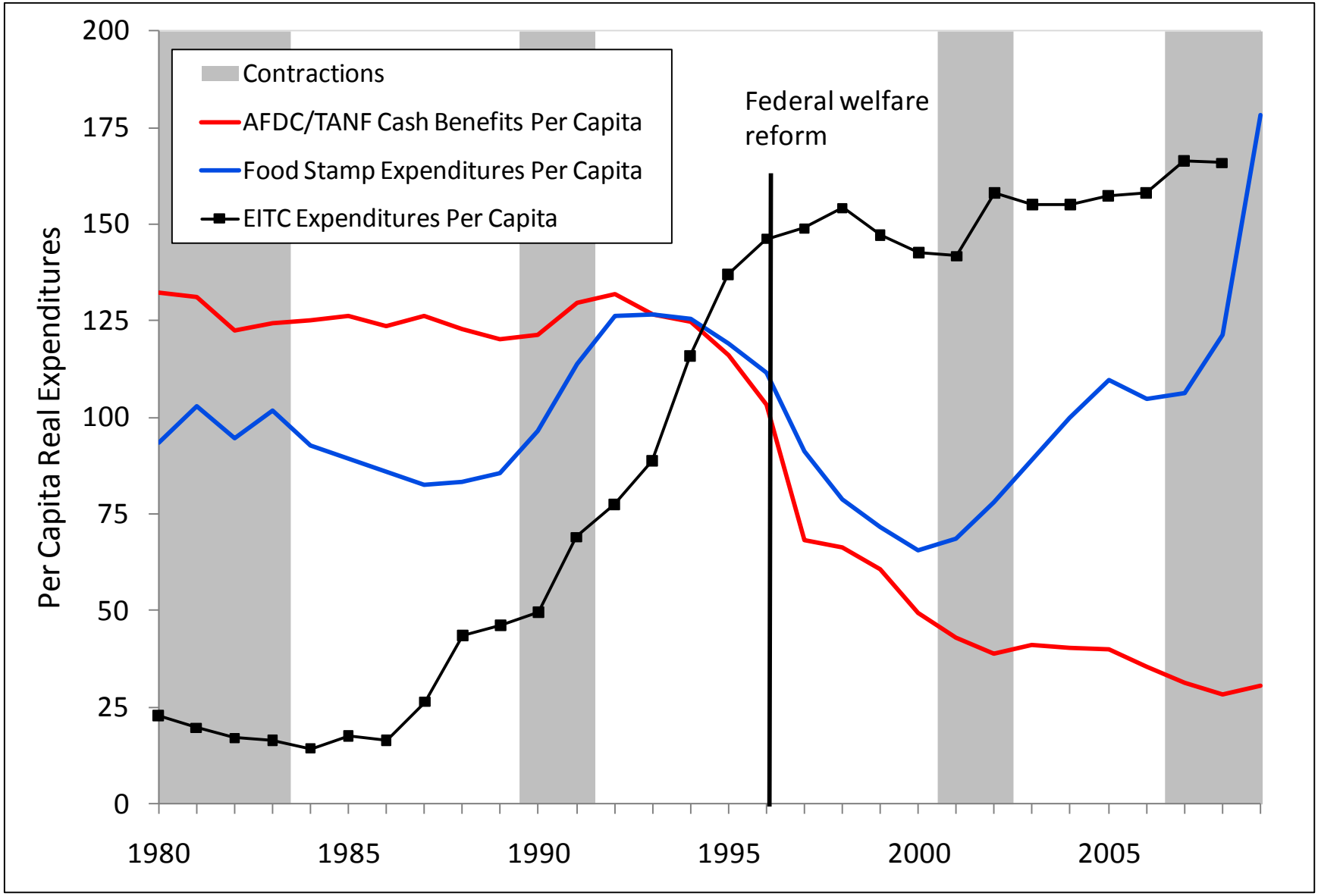
Hilary Hoynes
UC Davis

Joint with Douglas Almond, Columbia University
and Diane Whitmore Schanzenbach, Northwestern University

Context for Research Agenda

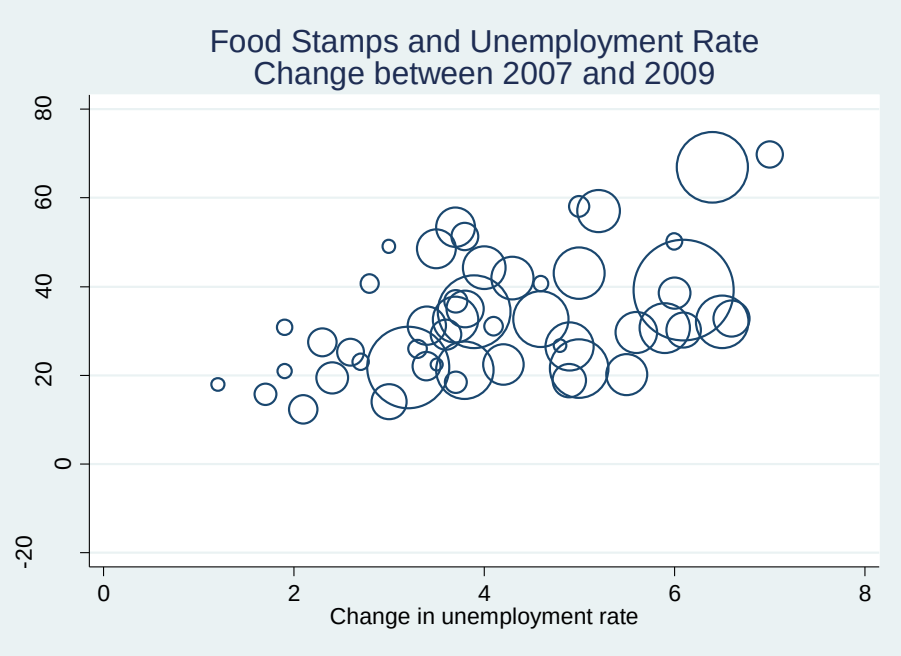
- The food stamp program is currently the largest cash or near-cash anti-poverty program in the U.S.:
  - In 2009 almost 1 in 9 persons received food stamps
  - Only U.S. universal safety net program.
- Given the importance of food stamps, it is surprising that so little is known about the program
  - The lack of credible evidence on the impacts of FSP derives from the fact that the program is national
  - Little variation across space or time; no variation in program parameters that are typically exploited by researchers
  - Most prior studies compare recipients to non-recipients (or structural modeling; some experiments)
- In our work, we identify the effect of the FSP using the county rollout of the program between 1961 and 1975
  - First quasi experimental evidence on the FSP

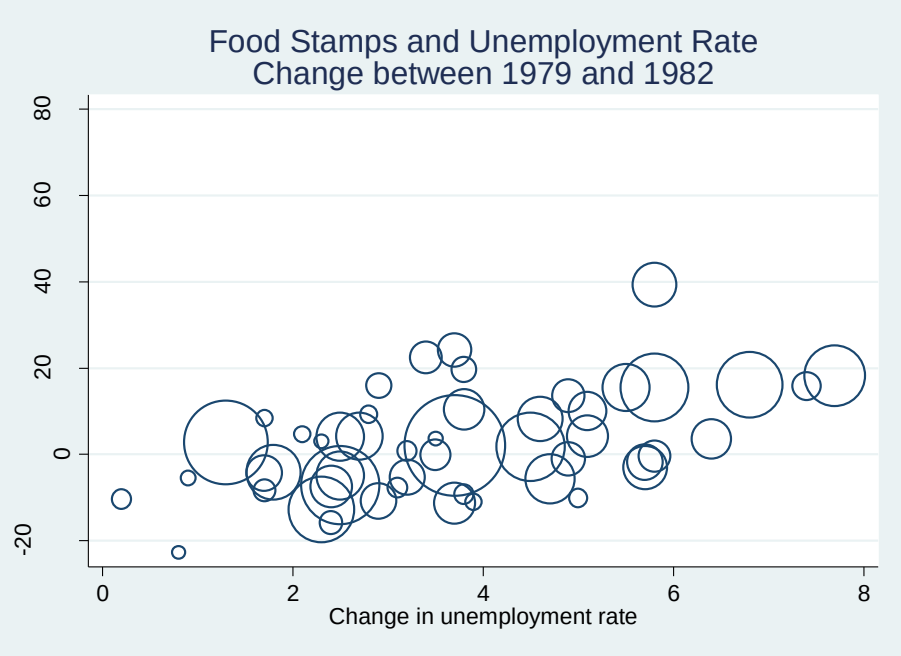
The landscape providing assistance to poor families with children has changed substantially



Food Stamps has become the fundamental safety net program

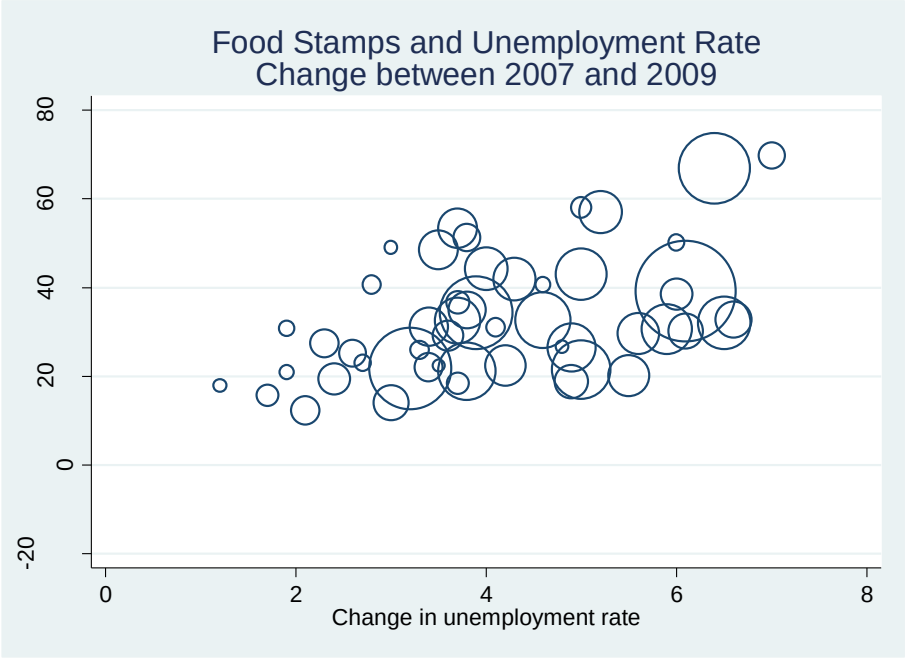
Comparison of current recession to early 1980s recession

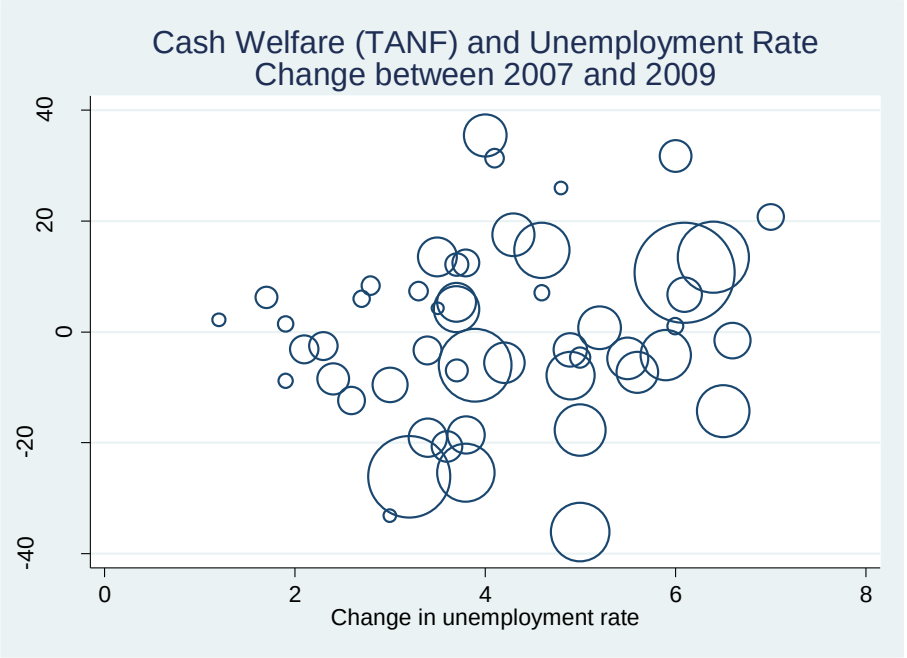




Food Stamps has become the fundamental safety net program

Comparison to TANF; current recession





Today's talk draws on two papers

- "Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes"
  - We use the full census of U.S. births and deaths from vital statistics to the examine the impact of the FSP on infant health
  - Incidence of low birth weight, infant mortality
- "Childhood Exposure to the Food Stamp Program: Long-run Health and Economic Outcomes"
  - Panel Study of Income Dynamics and use county of birth to assign FSP exposure in early life
  - Examine impact on adult BMI, health conditions, disability, economic outcomes
- Understanding the health effects of the FSP is important in its own right and for what it reveals about the relationship between income and health

Overview of presentation

- Food stamps as income? Mechanism for program impacts
- History of the food stamp program (program rollout)
- Food stamps and infant health
  - Identification strategy
  - Data
  - Results
- Food stamps and long run health and economic outcomes

Basics of the food stamp program (SNAP)

- 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 (other than AK, HI)
- 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 2009 benefits per person-month averaged $125 (maximum benefit for a 2-person family $323)

Food stamps as income? Mechanisms for program impacts

- Our earlier work (Hoynes and Schanzenbach *AEJ Applied* 2009) shows that households are infra-marginal
  - Because most recipients received a Food Stamp benefit below their normal food expenditures, the program is similar to an income transfer
- Given this, we argue that our results provide an estimate of the impact of an exogenous increase in income on health. Few studies provide any convincing evidence on this issue.
- Nonetheless, because recipients were by definition poor, a large portion of their FSP benefit was spent on food. Thus we expect that one channel for health gains would operate through improvement in nutrition
- Therefore, the goal of the analysis is twofold: (1) an evaluation of FSP; and (2) does increasing income improve health?

Why infant health?

- Families represent a substantial fraction of the FSP caseload (60%)
- Increased infant health outcomes (birth weight) lead to cost savings at birth as well as improvement in long term economic and health outcomes
  - See review in Almond and Currie (2010)
- Vital statistics data is appealing given that our research design requires identification of counties (and statistical power in the large samples)

Channels that FSP may affect infant health

- Increases in birth weight (without change in composition of births)
- Composition changes (reduce birth weight)
  - Increases in fertility among disadvantaged women
  - Increases in fetal survival

Our results for infant mortality and fertility suggest that the composition of births is not changing (and therefore not biasing down the effects).

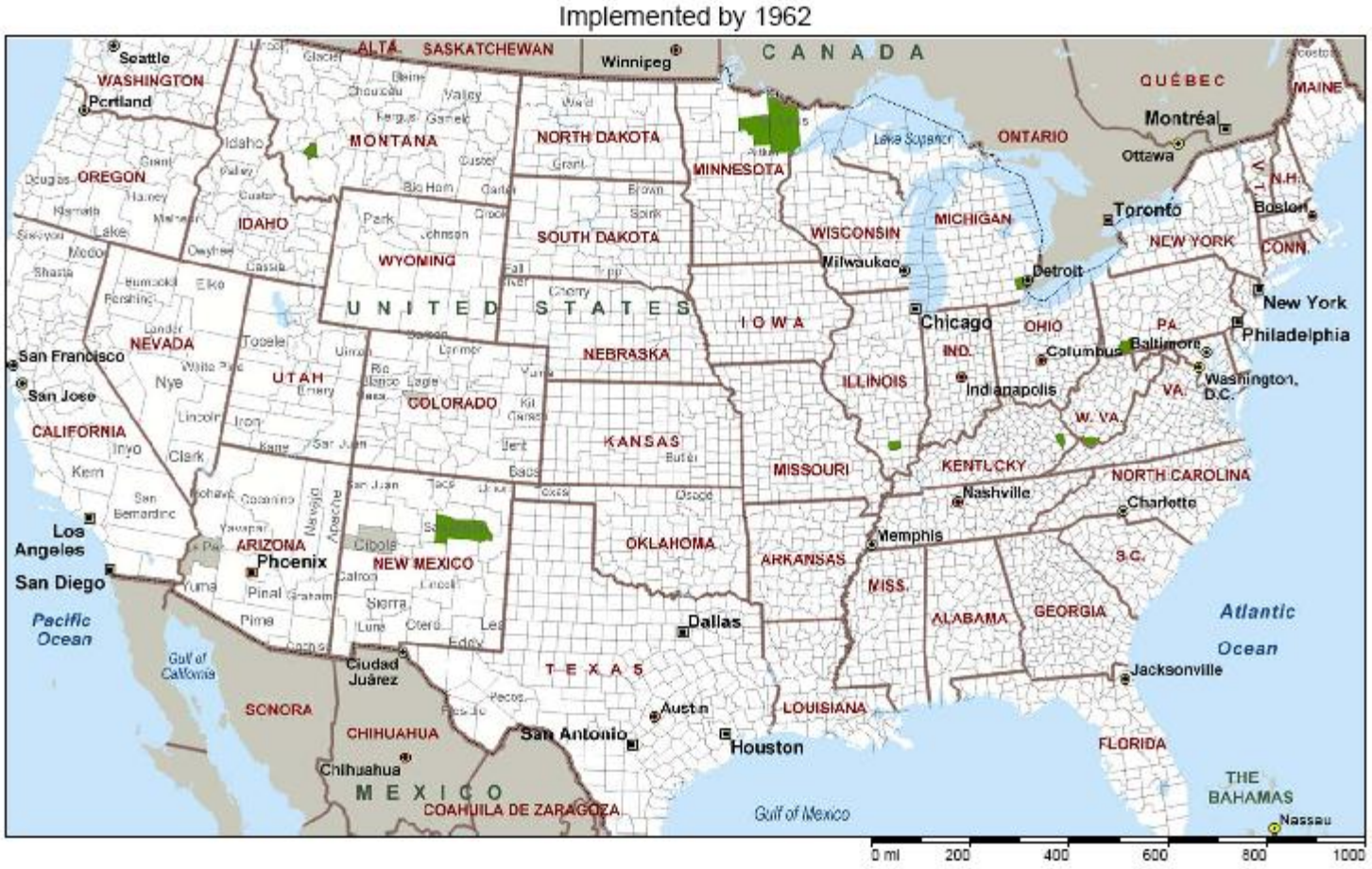
Food stamp program: Overview and program rollout

A Short History of the (modern) Food Stamp Program

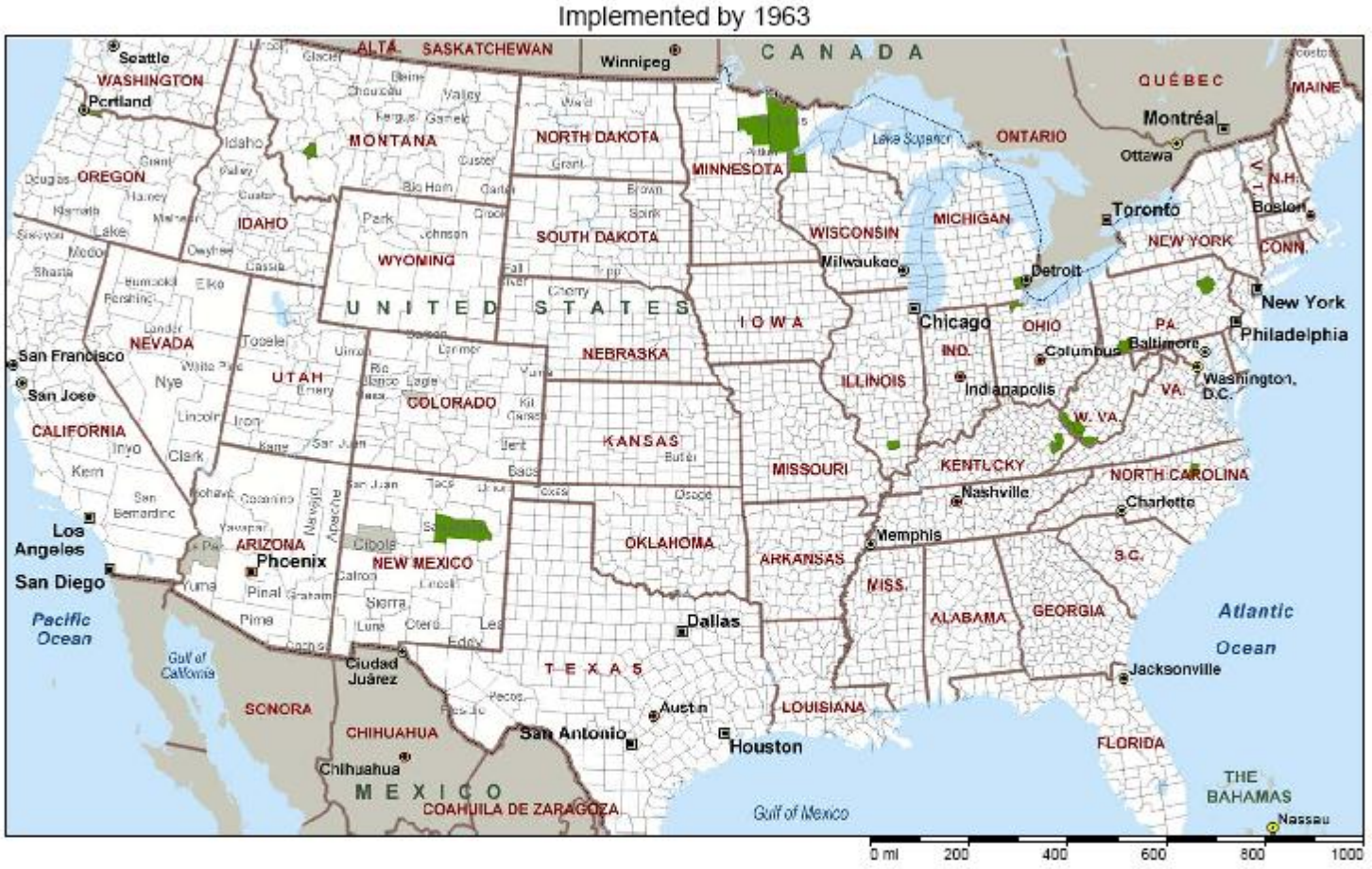
- 1961 Pres. Kennedy executive order; established 8 county-level pilot programs; 1962-1963 expanded to 43 counties
- Food Stamp Act of 1964:
  - gave local areas the authority to start up FSP in their county
  - Federally funded
  - Voluntary adoption by counties
- Steady increases in county adoption; constrained somewhat by budgetary limits
- 1973 amendments to Food stamp act: mandated that all counties offer FSP by 1975

Examining the timing of county introduction of food stamps

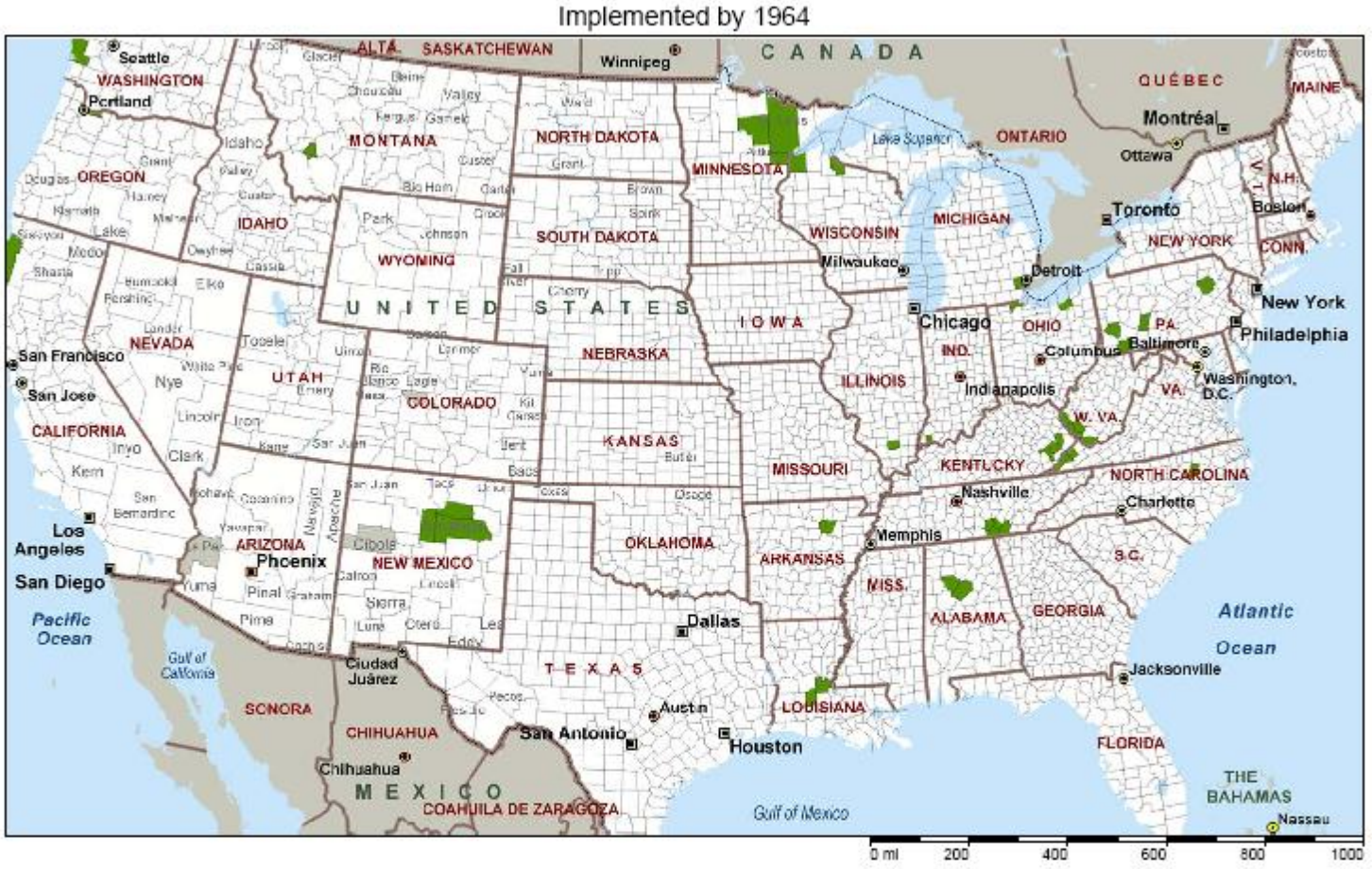
Jan 1962



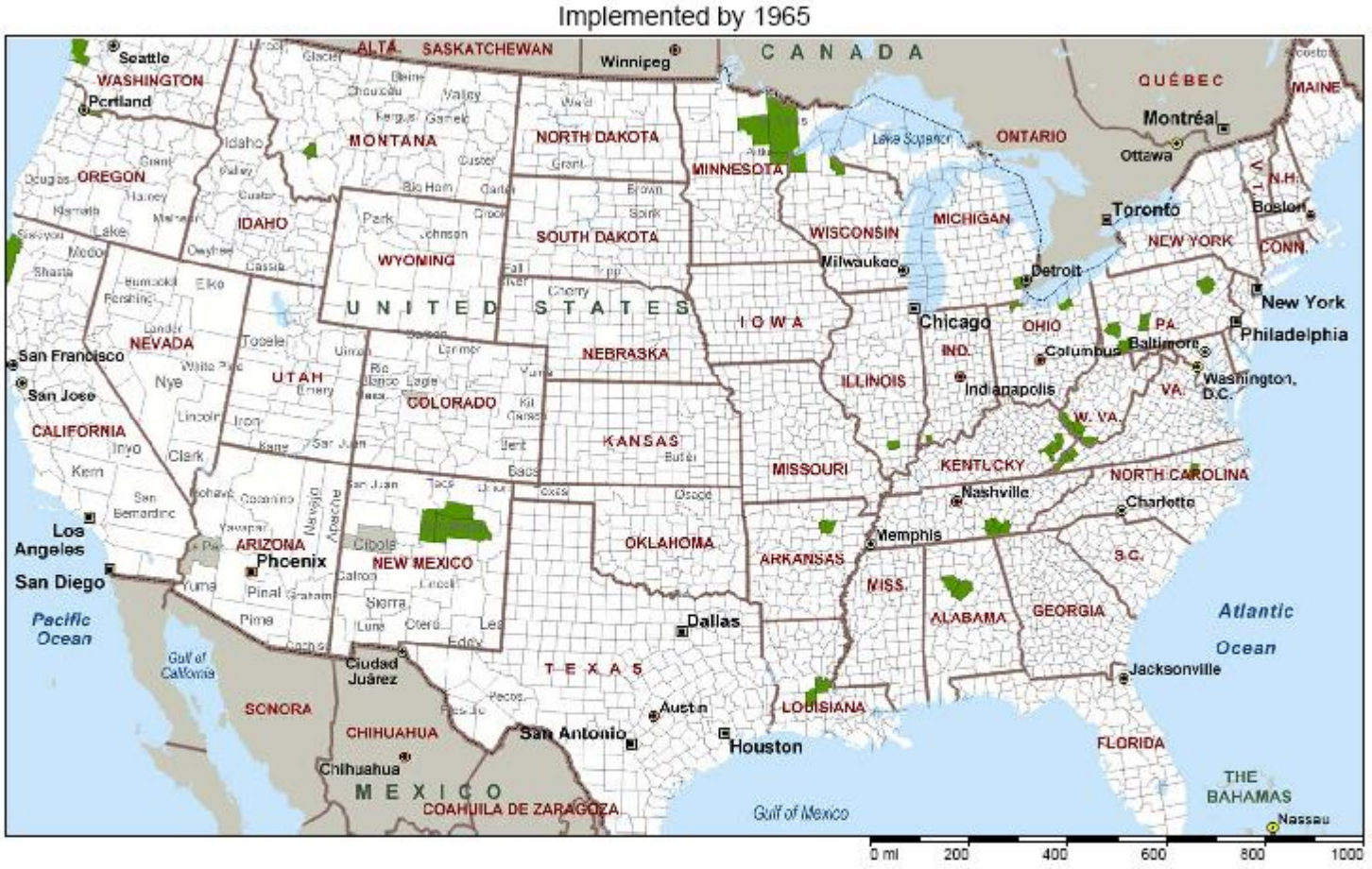
Jan 1963



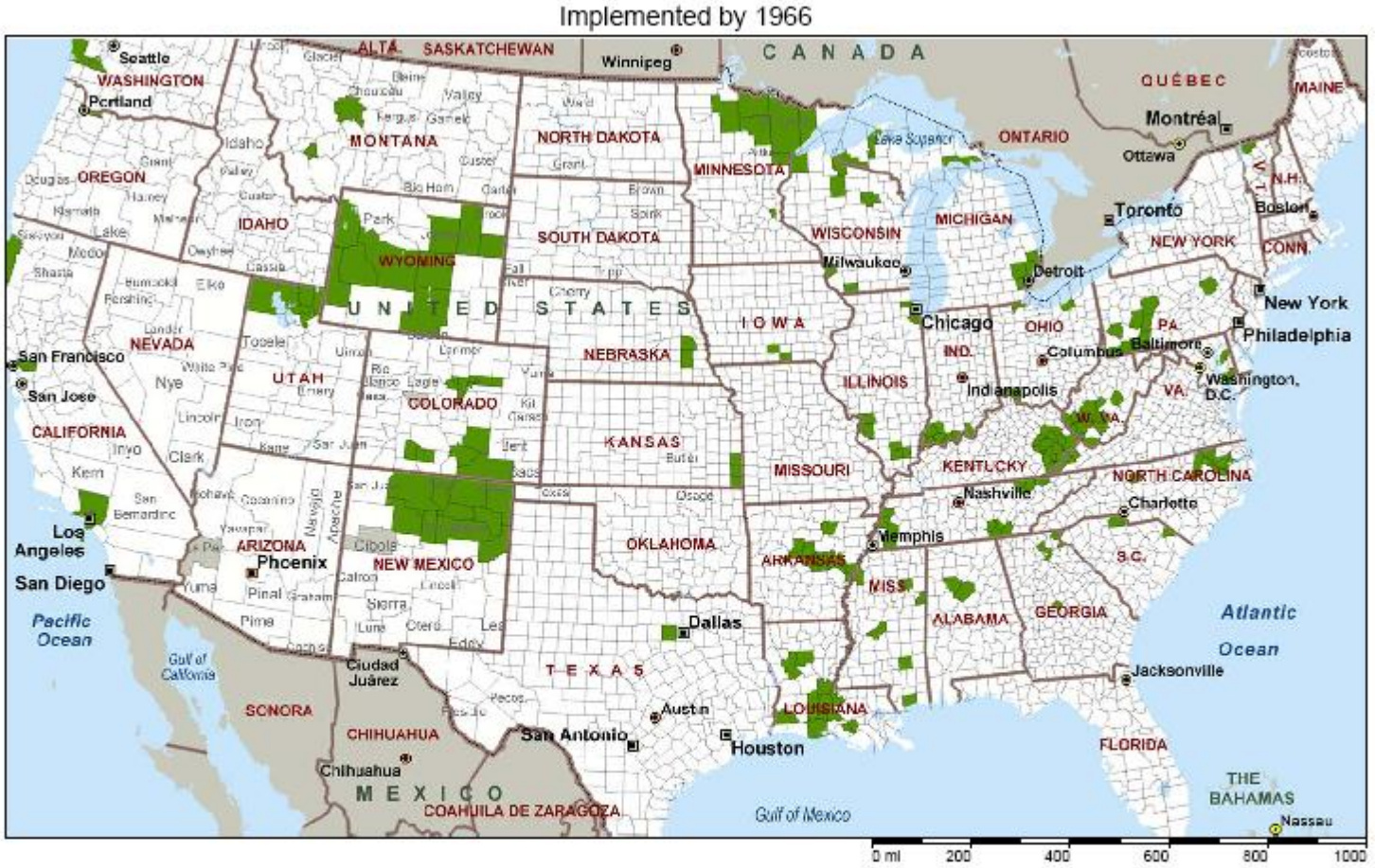
Jan 1964



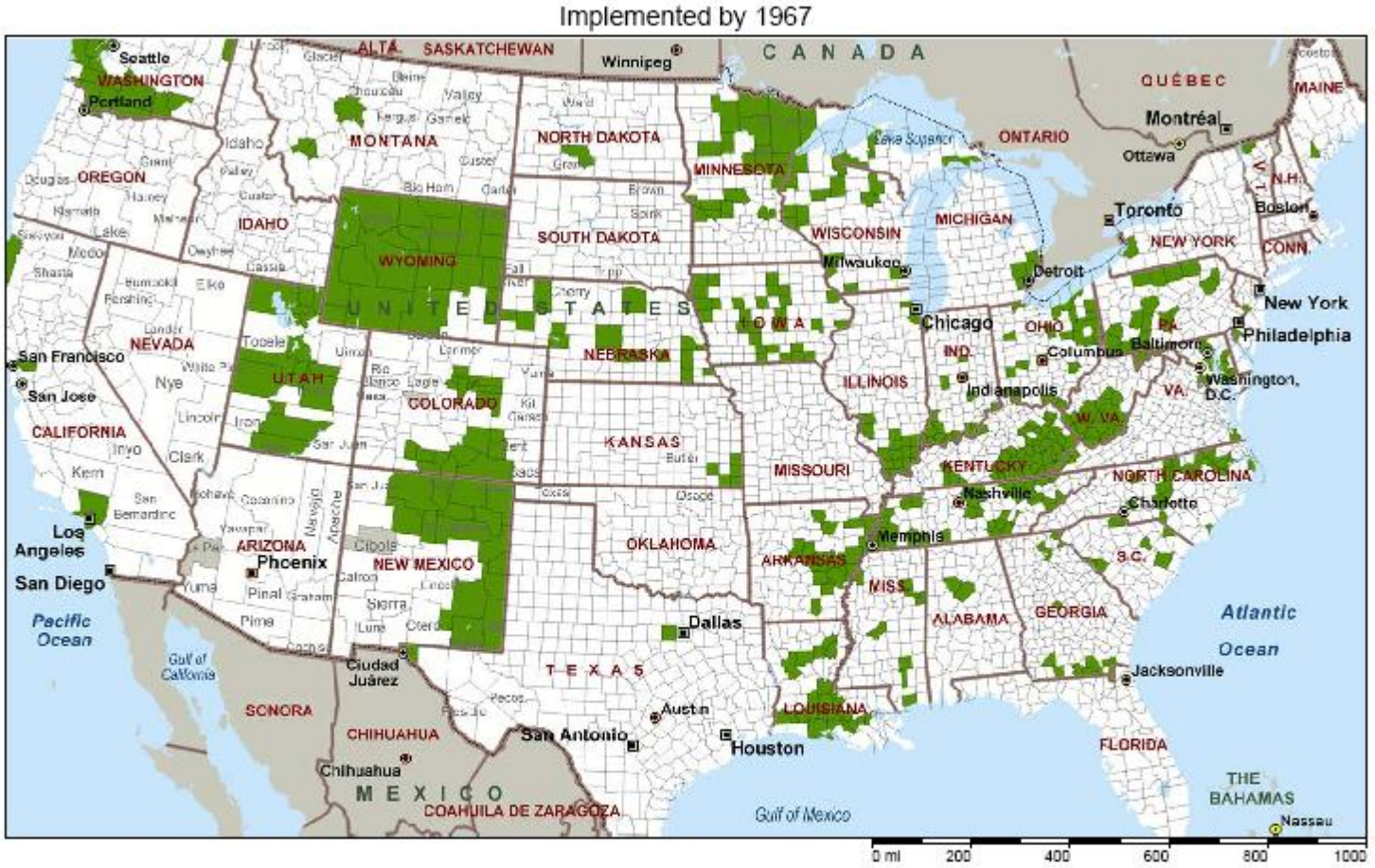
Jan 1965



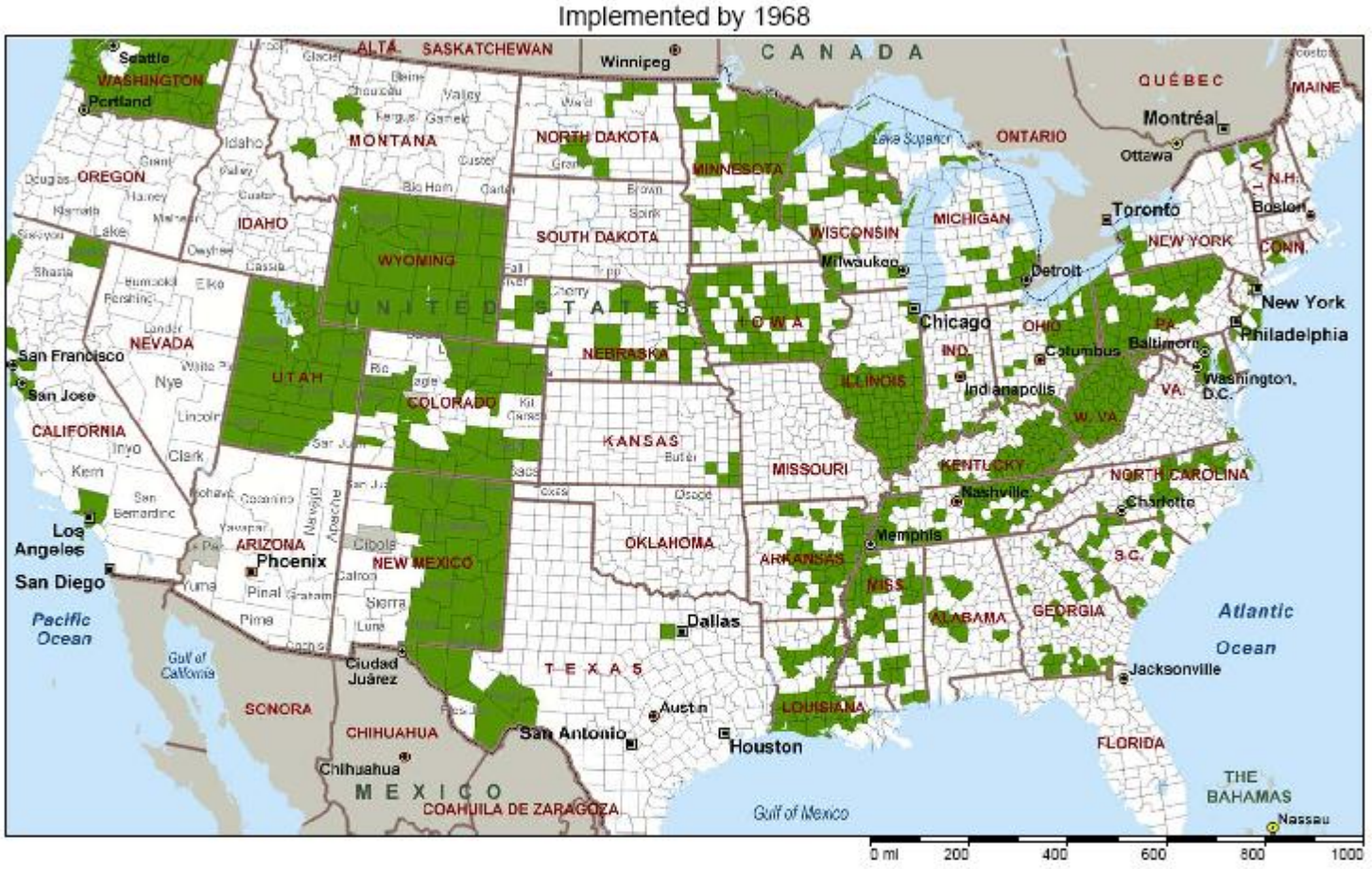
Jan 1966



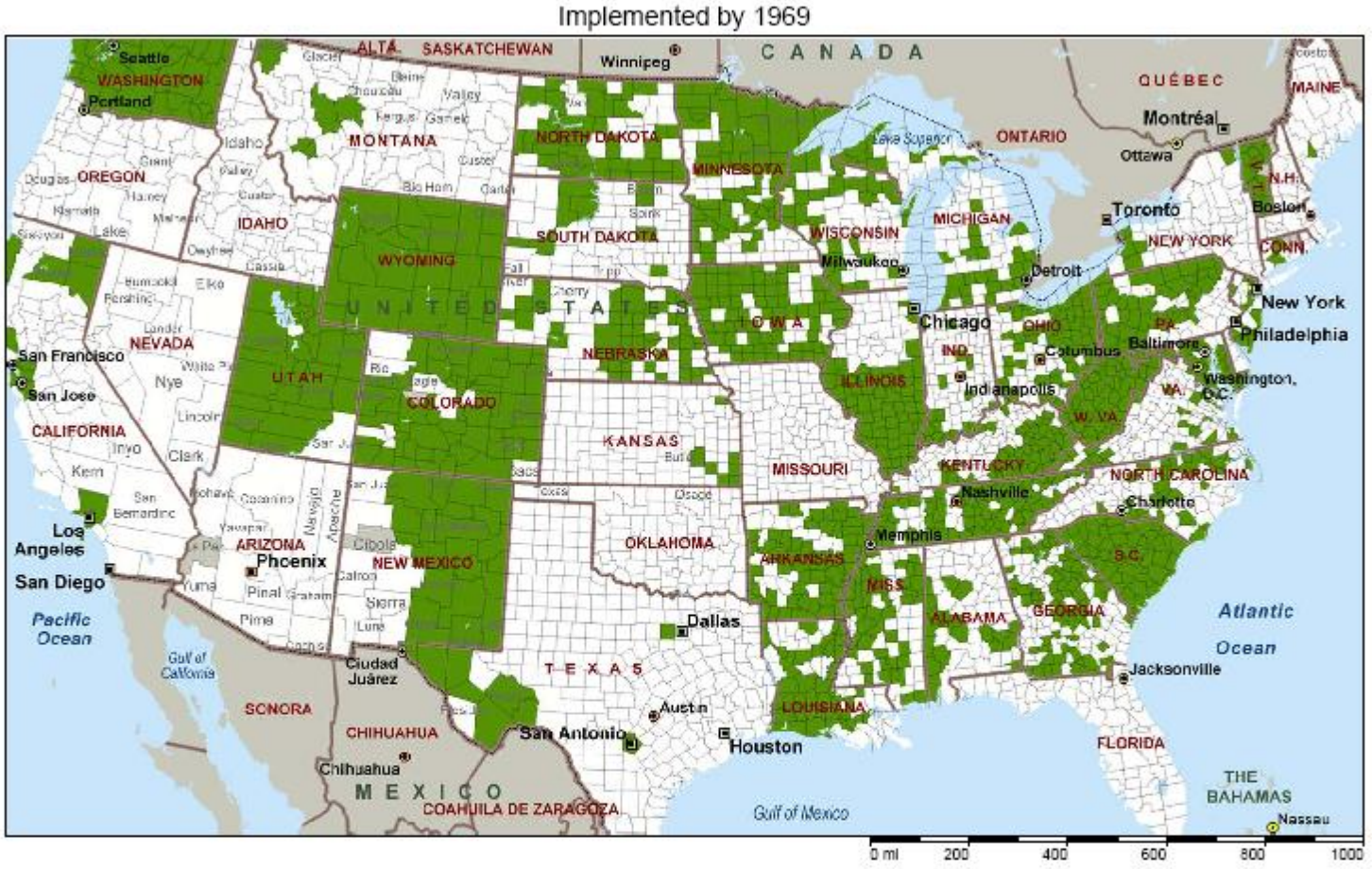
Jan 1967



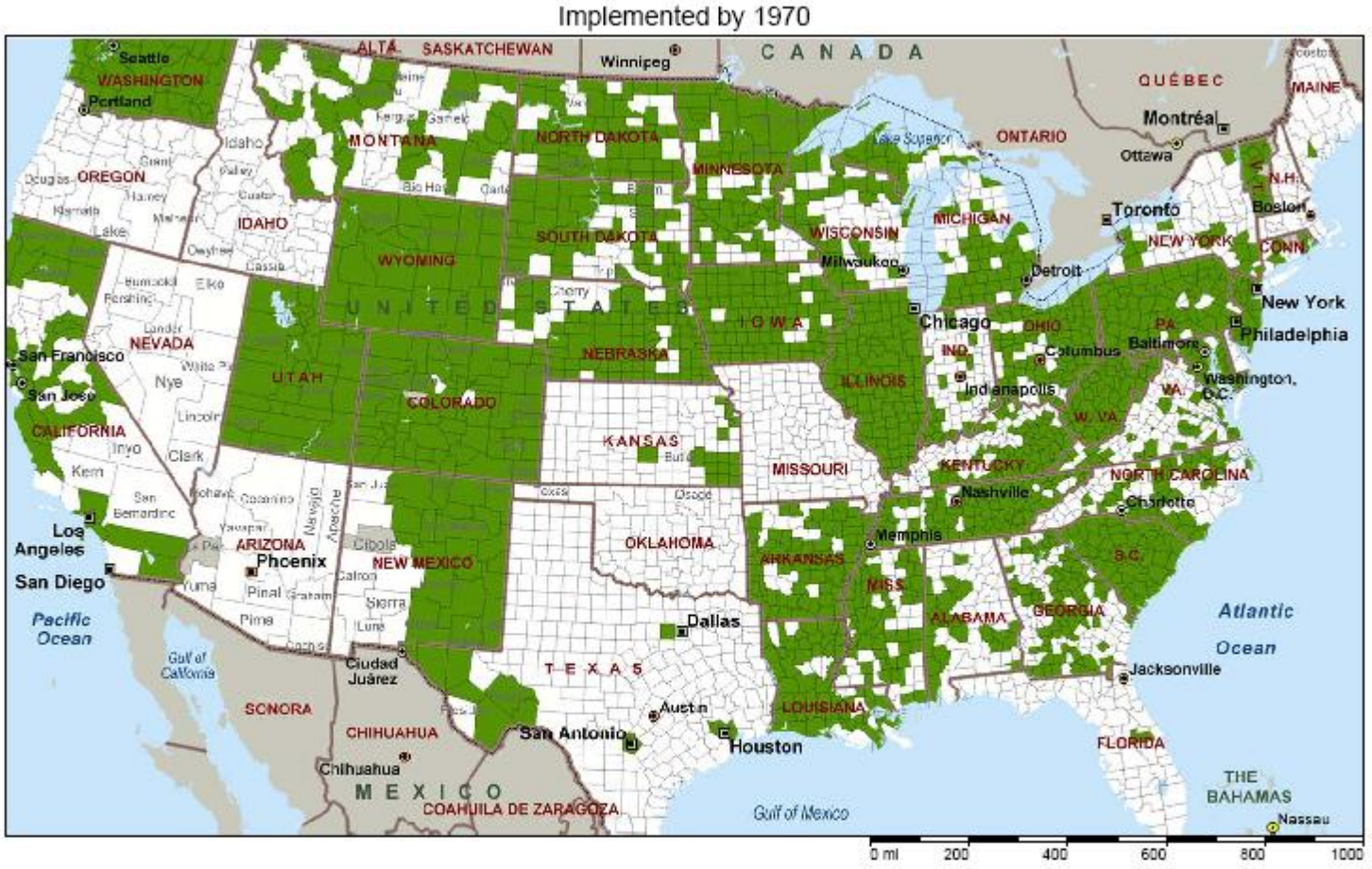
Jan 1968



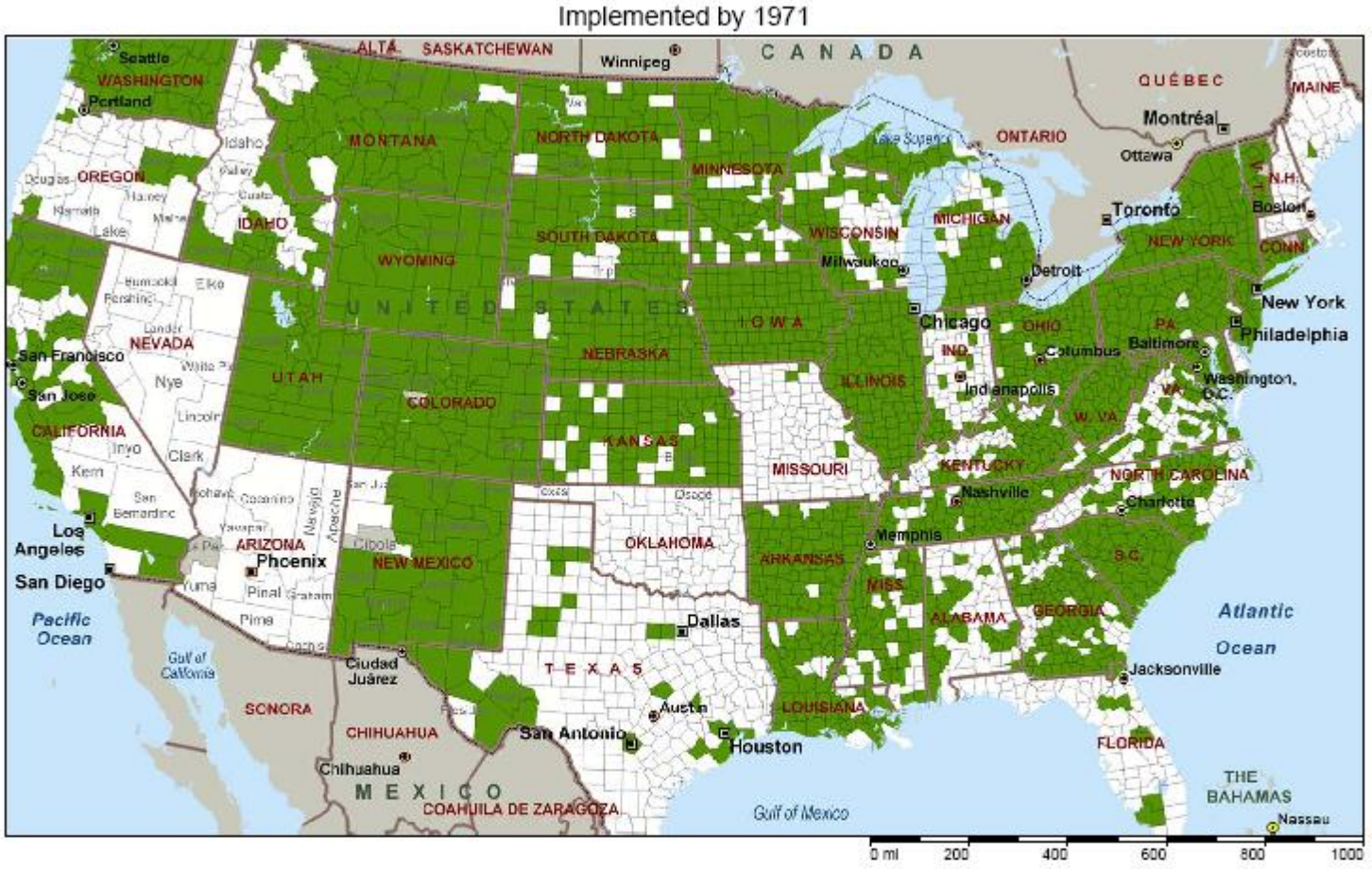
Jan 1969



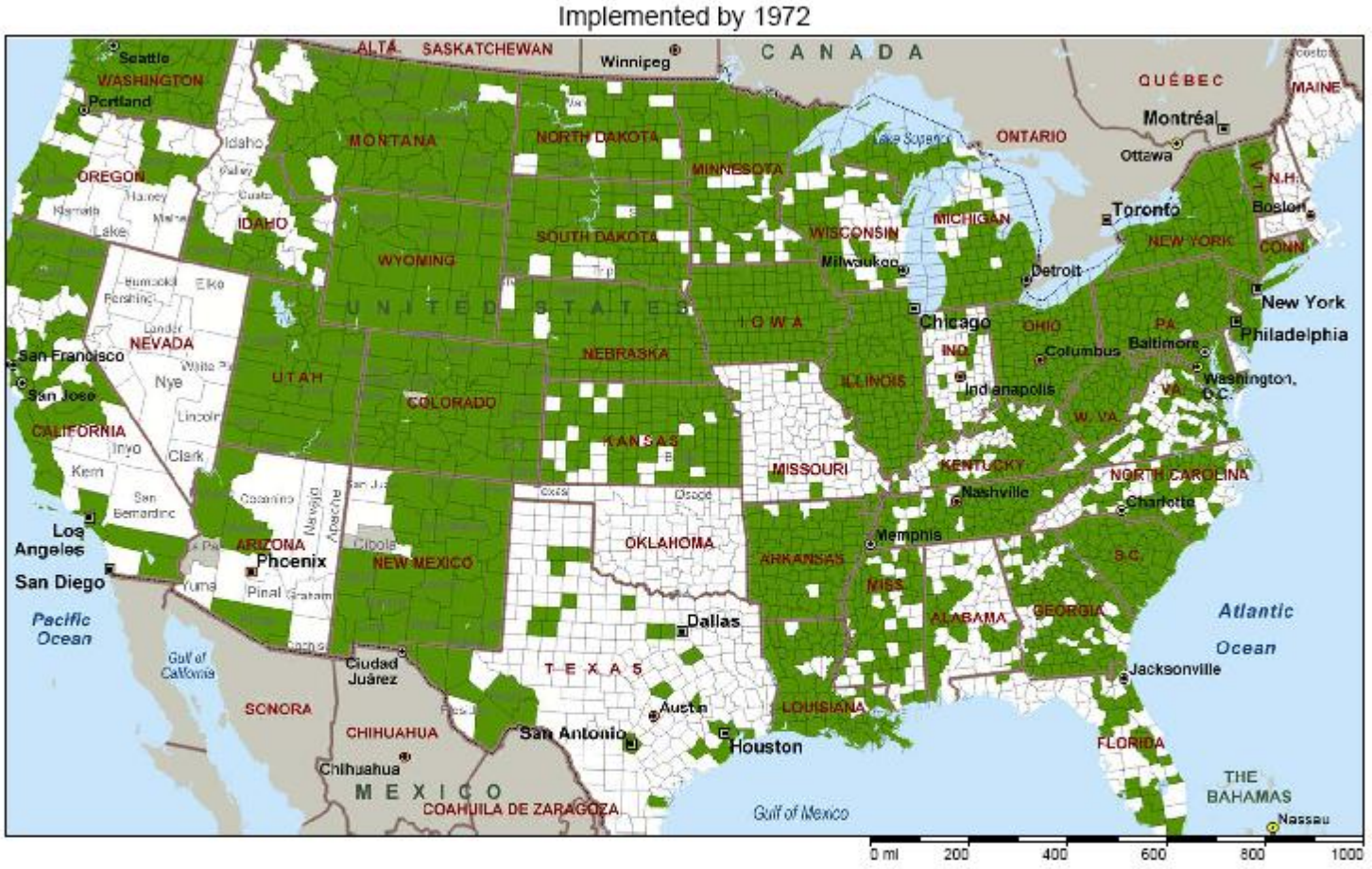
Jan 1970



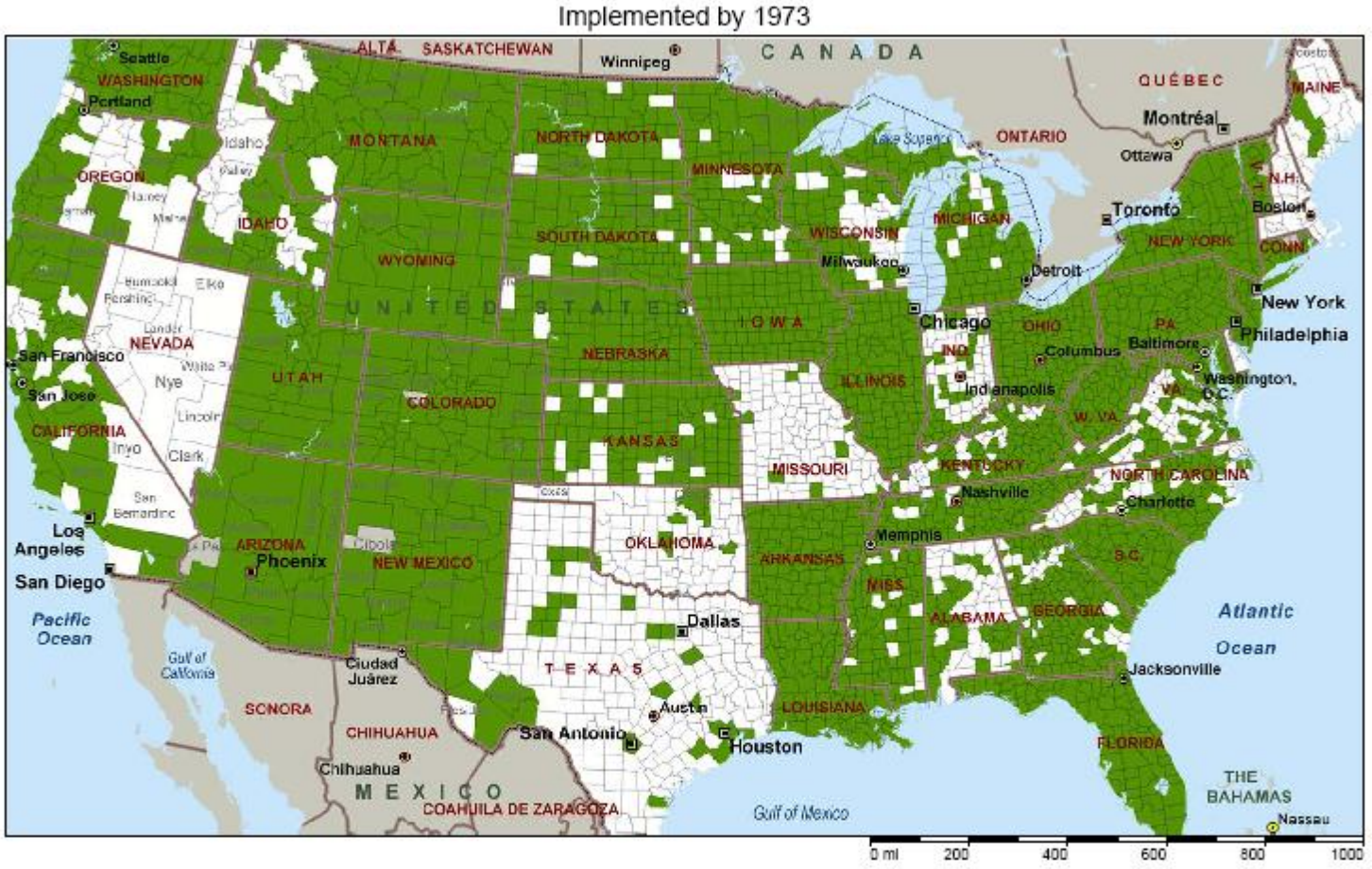
Jan 1971



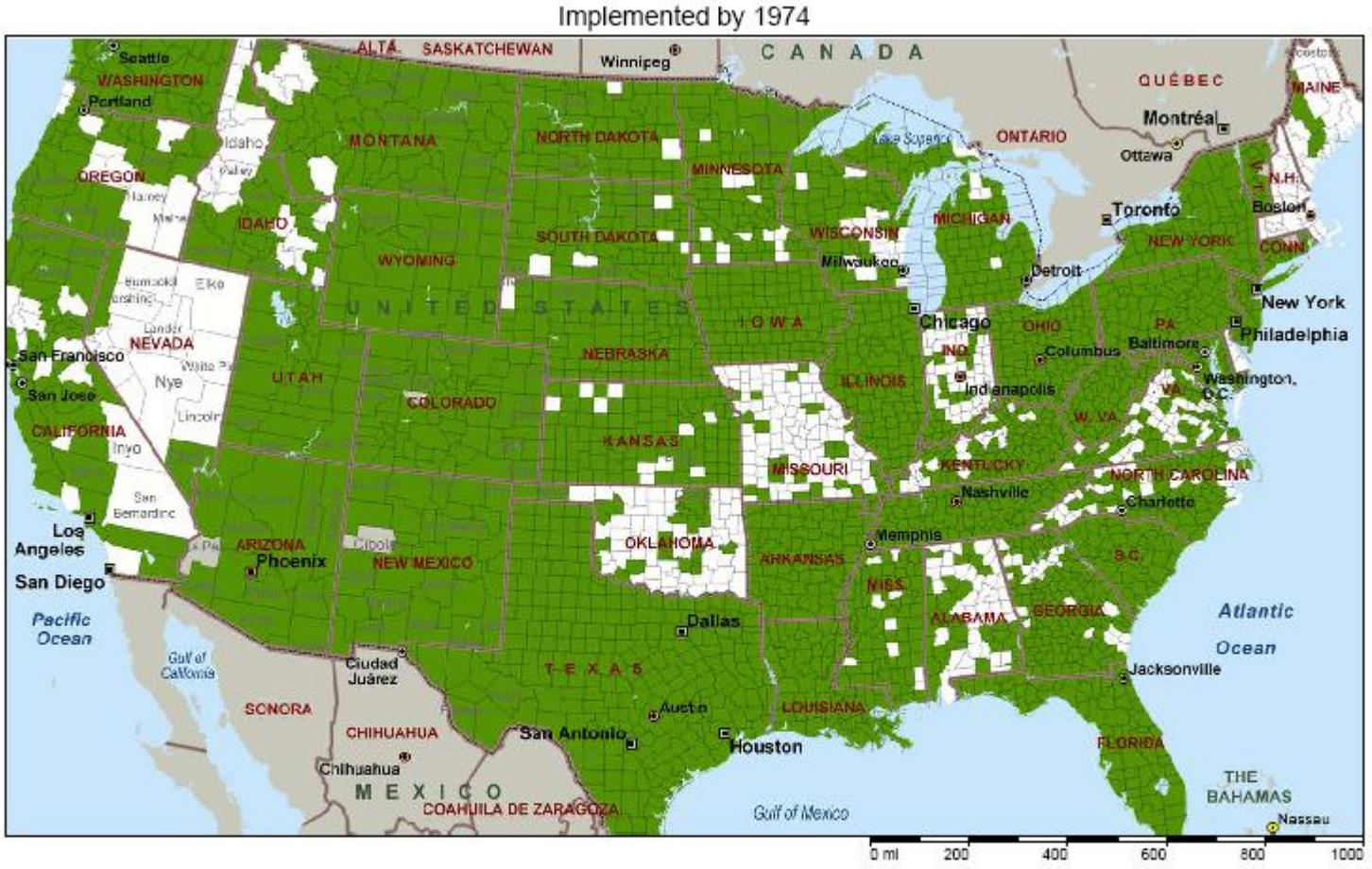
Jan 1972



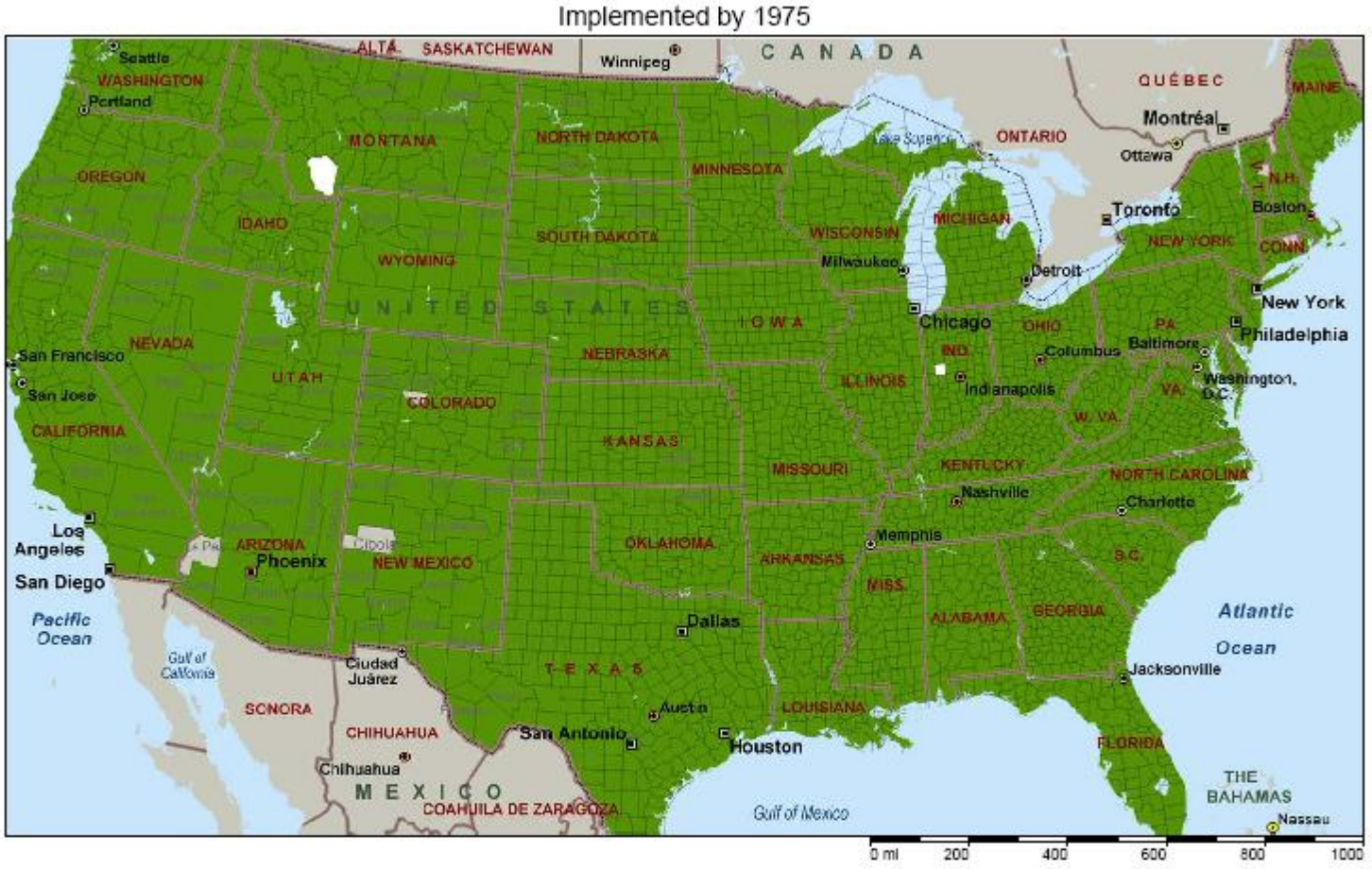
Jan 1973



Jan 1974



Jan 1975

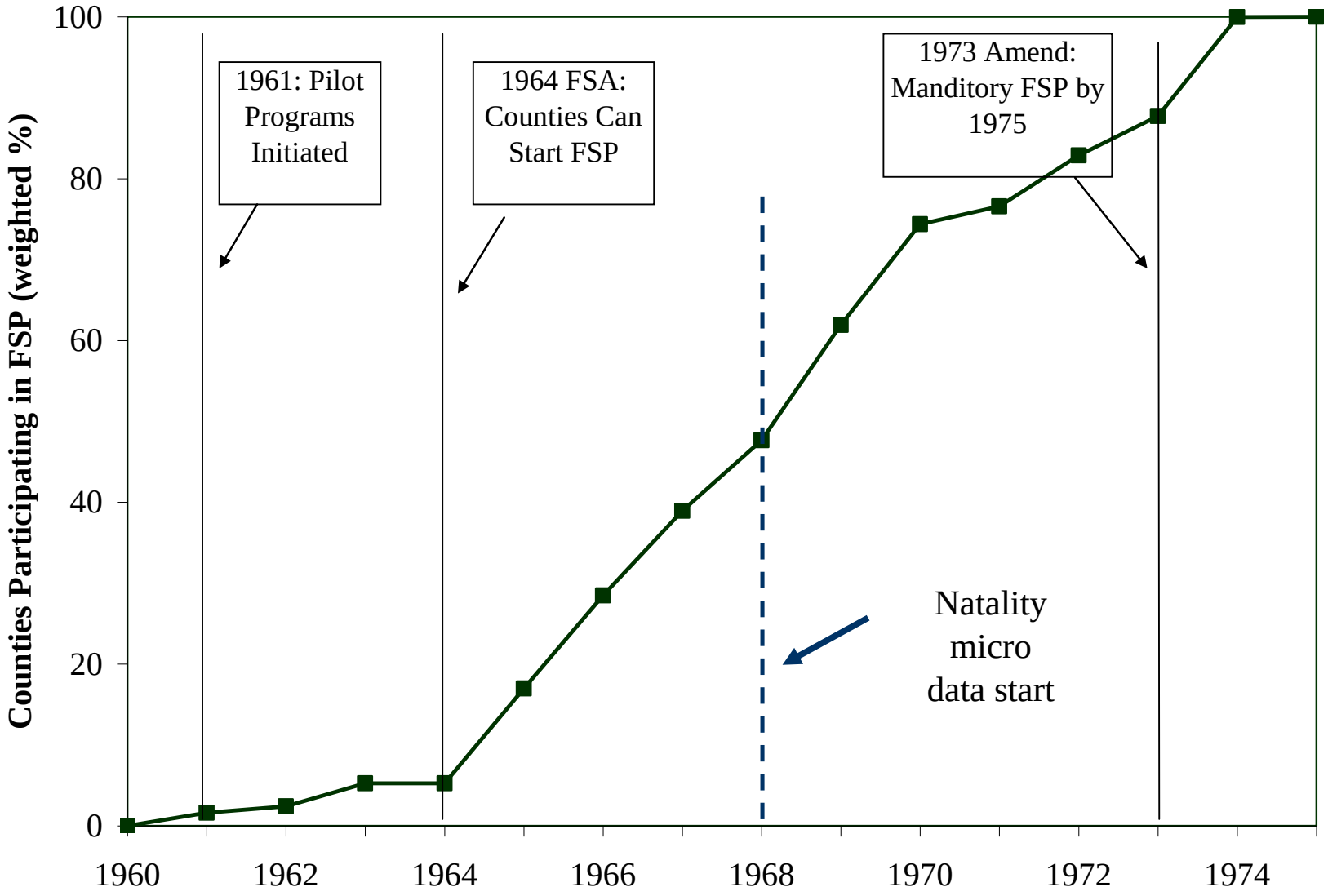


- Our basic identification strategy uses this county level variation in food stamp “treatment”

What existed prior to FSP?

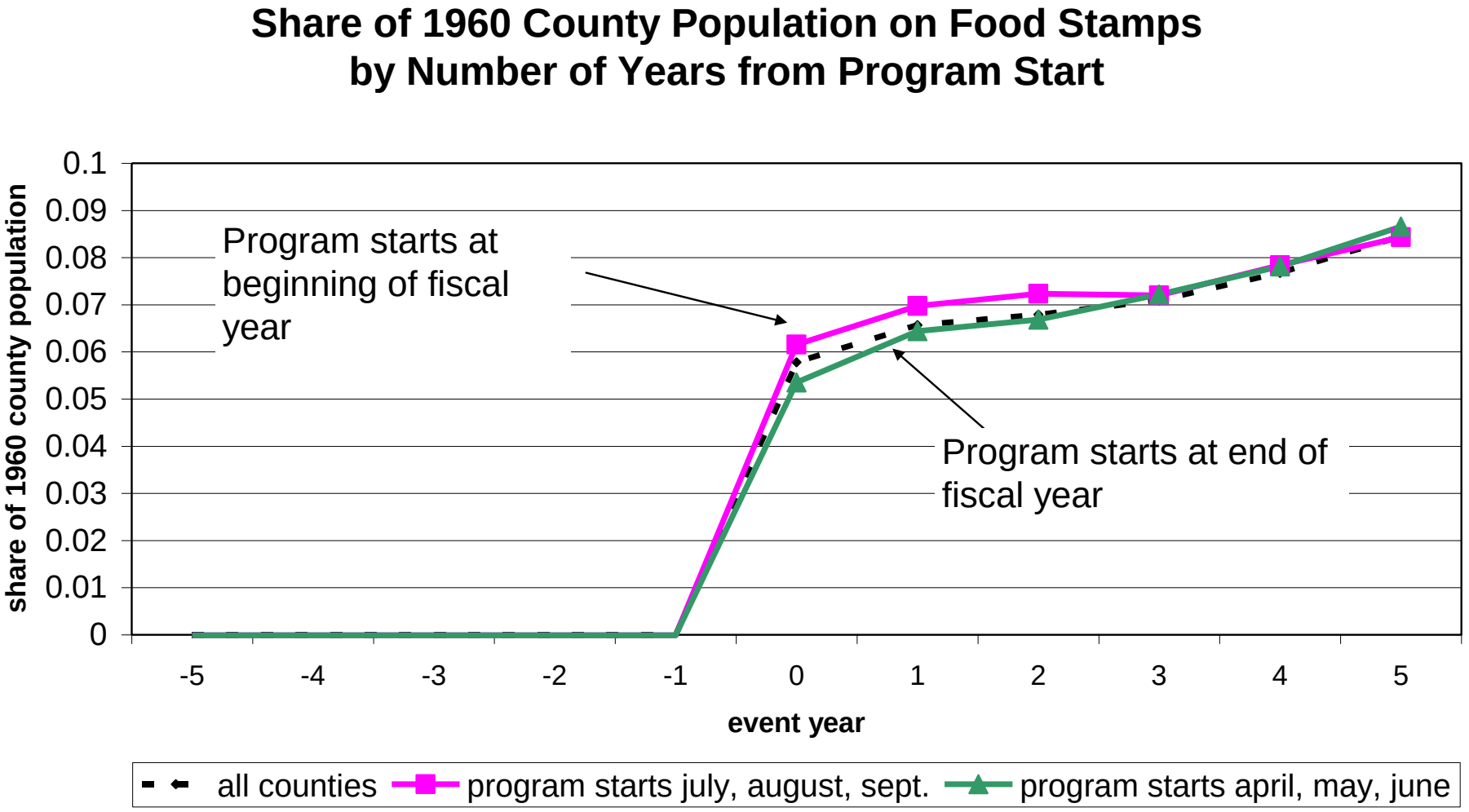
- Commodity distribution program (CDP) was precursor to FSP
- *Goal of CDP:* support farm prices and farm income by removing surplus commodities from market
- The evidence shows that the FSP represents an important "treatment" over and above the CDP. The CDP:
  - not universally available: in 1967, 1/3 of the poorest 1,000 counties offered no food assistance program
  - limited range of products (most common items include flour, cornmeal, rice, dried milk, cheese, butter)
  - distribution centers that were difficult to reach
  - infrequent timing of distribution of goods
- Nonetheless, unfortunately there is sparse data on county participation in the CDP so we are unable to use this in our empirical work

Percent of US population covered by FSP



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

How quickly do FS Programs ramp up?



Identification Strategy
(and is FSP introduction exogenous?)

General Methodology

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

$$y_{ct} = \alpha + \delta FSP_{ct} + \eta_c + \lambda_t + \phi_{st} + \gamma_1 Z_{c60} * t + \gamma_2 TP_{ct} + \varepsilon_{ct}$$

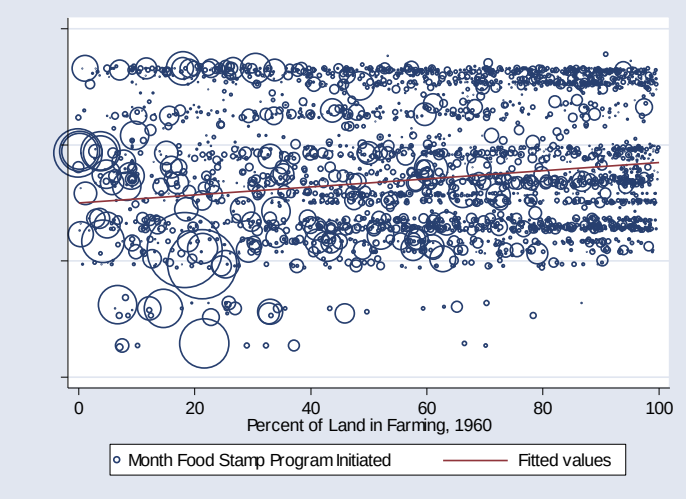
- Observations are at the county (c), time (t) level
- Identification comes from variation across counties over time in adoption of FSP (FSP_{ct})
- Fixed effects for county, time and state*year (or county*linear time)
- We also control for possible confounders:
  - 1960 county characteristics interacted with linear time (Z_{c60})
  - Per capita annual county expenditures on other government transfer programs (TP_{ct})
- Standard errors clustered on county

Exogeneity of FSP adoption (Hoynes and Schanzenbach AEJ Policy 2009)

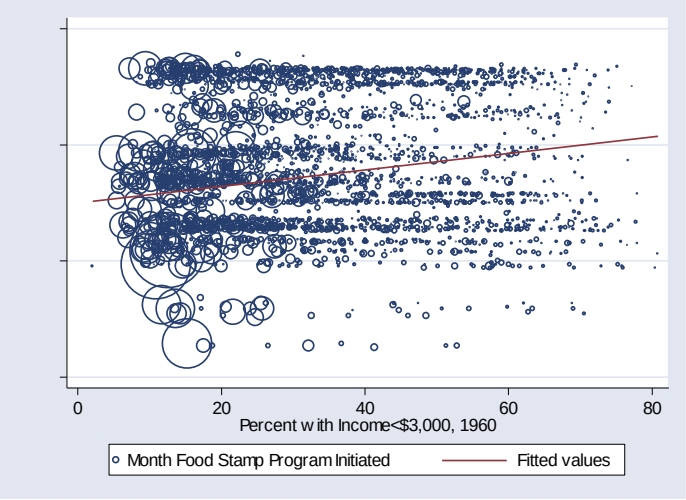
- During period prior to mandatory county adoption, there was a political battle between farm interests and advocates for the poor (supporting FSP)
- If differences between counties affected the timing of FSP adoption AND if the trends in outcomes are correlated with this timing, then our identification is not valid
- In our earlier work, we estimated the determinants of county adoption of FSP using county pre-treatment variables (from 1960 Census of Population and Census of Agriculture)
- Consistent with political accounts, earlier county food stamp adoption occurs for counties with:
  - Larger % of population black, poor, urban, larger population and smaller % of land used in farming

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

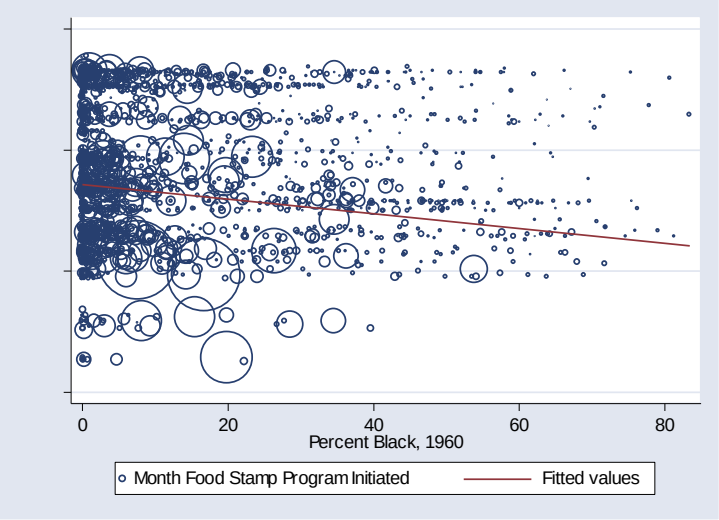
(a) % land in farming



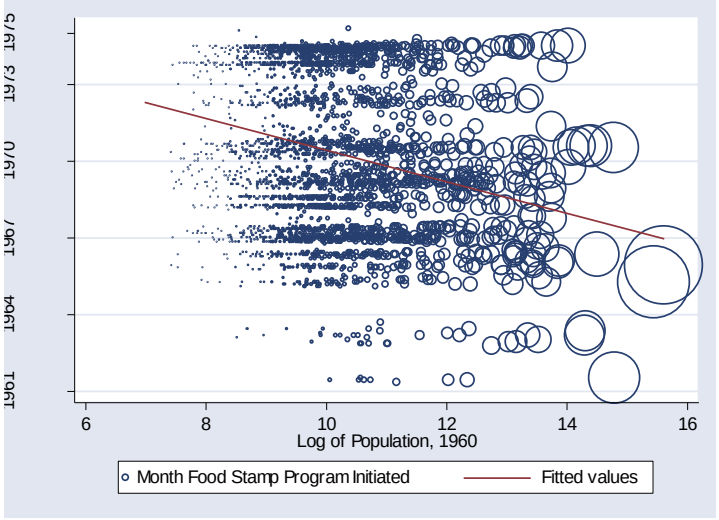
(b) % income<$3,000



(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 FSP adoption and time to the main models to control for the possible (observed) predictors of adoption.

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

Bottom line is that variation in adoption dates:

- Little relation to county per capita income, other transfers, etc.
- Adoption in individual counties is constrained by federal appropriations
- *Controlling for other program spending (e.g. AFDC), county trends, has little effect on estimates*

Analysis of Natality Micro data

- Micro data of births in the U.S. available starting in 1968
- Data identifies state and county of residence (and occurrence), and month of birth
- We collapse the data to the county-quarter level separately for whites and blacks
- Birth outcomes:
  - Main measures: mean birth weight, fraction of births that are low birth weight (<2,500 grams)
  - Other measures: Fraction of births that are very low birth weight (<1,500 grams), fraction that are pre-term (<37 weeks), fraction that are female.
- Regressions weighted by number of births in cell. Drop cells with fewer than 25 births.

Assigning the timing of FSP treatment

- Birth data identifies county and month of birth
- We assign FSP=1 if county has program in place by the beginning of the 3rd trimester (3 months prior to birth)
  - Prior research suggests nutritional access in third trimester is most important timing for birth weight and early survival.
  - We experiment with this timing
- We then collapse data (including FSP) to quarters

Take-up and interpreting magnitude of effects

- We do not observe FSP participation in natality data
- Not all births in county were to women eligible for FSP
- CPS (1980) provides a benchmark on participation in FSP, for women with young children (proxy for pregnant women)
  - 13% for whites
  - 41% for blacks
- We use these participation rates to adjust estimates to reflect average effect of the treatment on the treated.
- If participation rates were lower during this early food stamp period (than measured in the 1980 CPS) then our reported TOT estimates are underestimates of the true effect.

Main Results: Impact of FSP on birth weight and LBW 1968-1977, WHITES (Table 1)

	Birthweight				Fraction < 2,500 grams			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. WHITES								
Ave FSP (0/1)	2.039	2.635	2.089	2.175	-0.0006	-0.0006	-0.0006	-0.0006
	(0.947)*	(0.896)**	(1.039)*	(0.975)**	(0.0003)*	(0.0003)*	(0.0003)	(0.0004)
% Impact (coef/mean)	0.06%	0.08%	0.06%	0.06%	-1.02%	-1.02%	-0.97%	-0.97%
Estimate inflated	15.68	20.27	16.07	16.73	-0.0047	-0.0047	-0.0045	-0.0045
% Impact inflated	0.47%	0.61%	0.48%	0.50%	-7.82%	-7.82%	-7.44%	-7.44%
1960 CCDB * linear time	x	x	x		x	x	x	
REIS controls	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
county fixed effects	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 (whites)	97,785	97,785	97,785	97,785	97,785	97,785	97,785	97,785
R-squared (whites)	0.54	0.55	0.55	0.56	0.17	0.17	0.18	0.19
mean of dependant variable (whites)	3350	3350	3350	3350	0.06	0.06	0.06	0.06

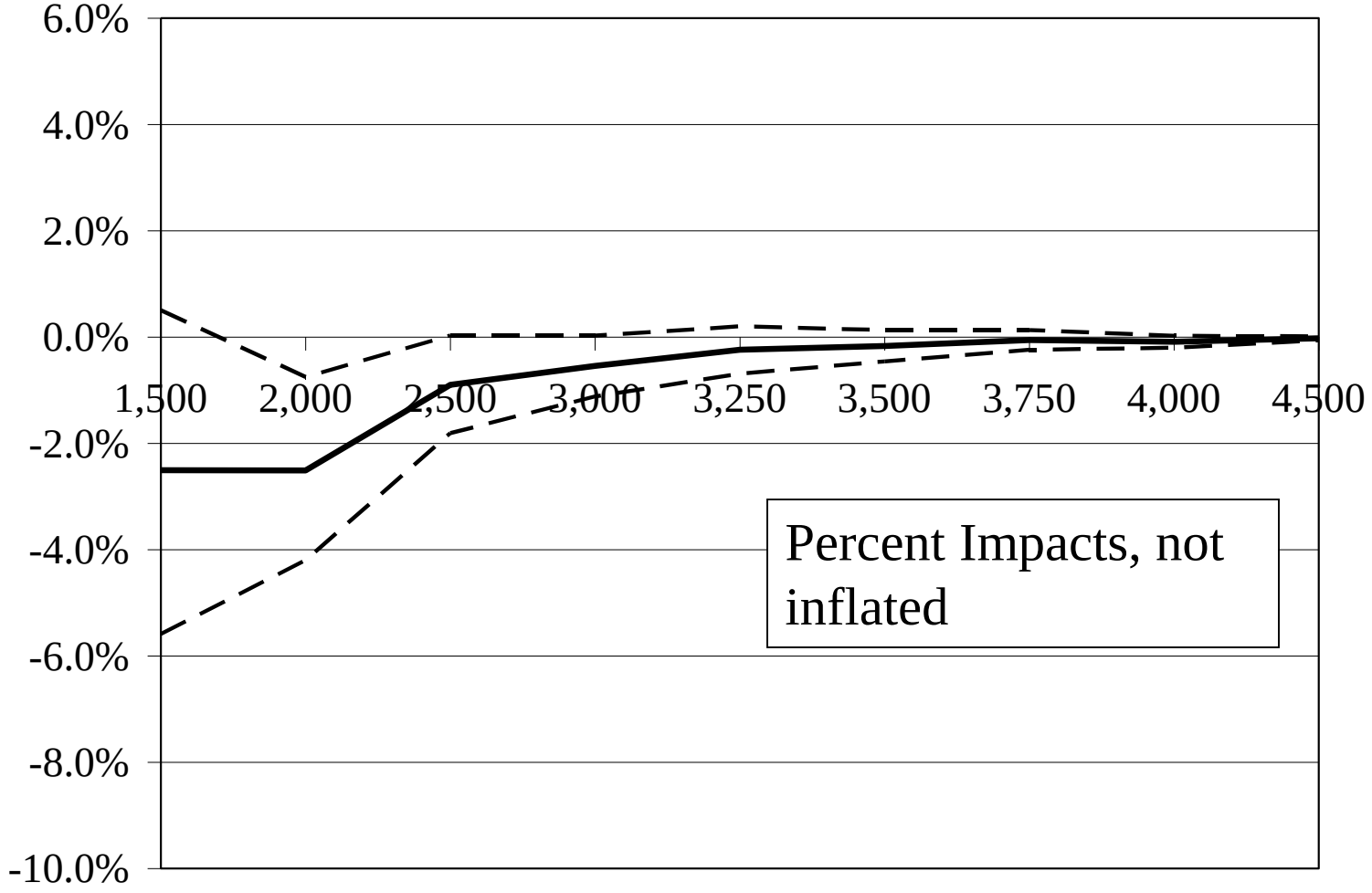
FSP shows most improvement in infant health. Robust, statistically significant.

Main Results: Impact of FSP on birth weight and LBW 1968-1977, BLACKS (Table 1)

	Birthweight				Fraction < 2,500 grams			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
B. BLACKS								
Ave FSP (0/1)	3.454	4.120	5.466	1.665	-0.0015	-0.0016	-0.0019	-0.0009
	(2.660)	(2.317)	(2.579)*	(2.330)	(0.0010)	(0.0010)	(0.0012)	(0.0012)
Impact relative to mean	0.11%	0.13%	0.18%	0.05%	-1.13%	-1.22%	-1.49%	-0.68%
Estimate inflated	26.57	31.69	42.05	12.80	-0.0113	-0.0122	-0.0149	-0.0068
% Impact inflated	0.86%	1.02%	1.36%	0.41%	-8.70%	-9.41%	-11.48%	-5.21%
1960 CCDB * linear time	x	x	x		x	x	x	
REIS controls	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
county fixed effects	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 (blacks)	27,374	27,374	27,374	27,374	27,374	27,374	27,374	27,374
R-squared (blacks)	0.32	0.33	0.34	0.35	0.15	0.15	0.17	0.18
mean of dependant variable (blacks)	3097	3097	3097	3097	0.13	0.13	0.13	0.13

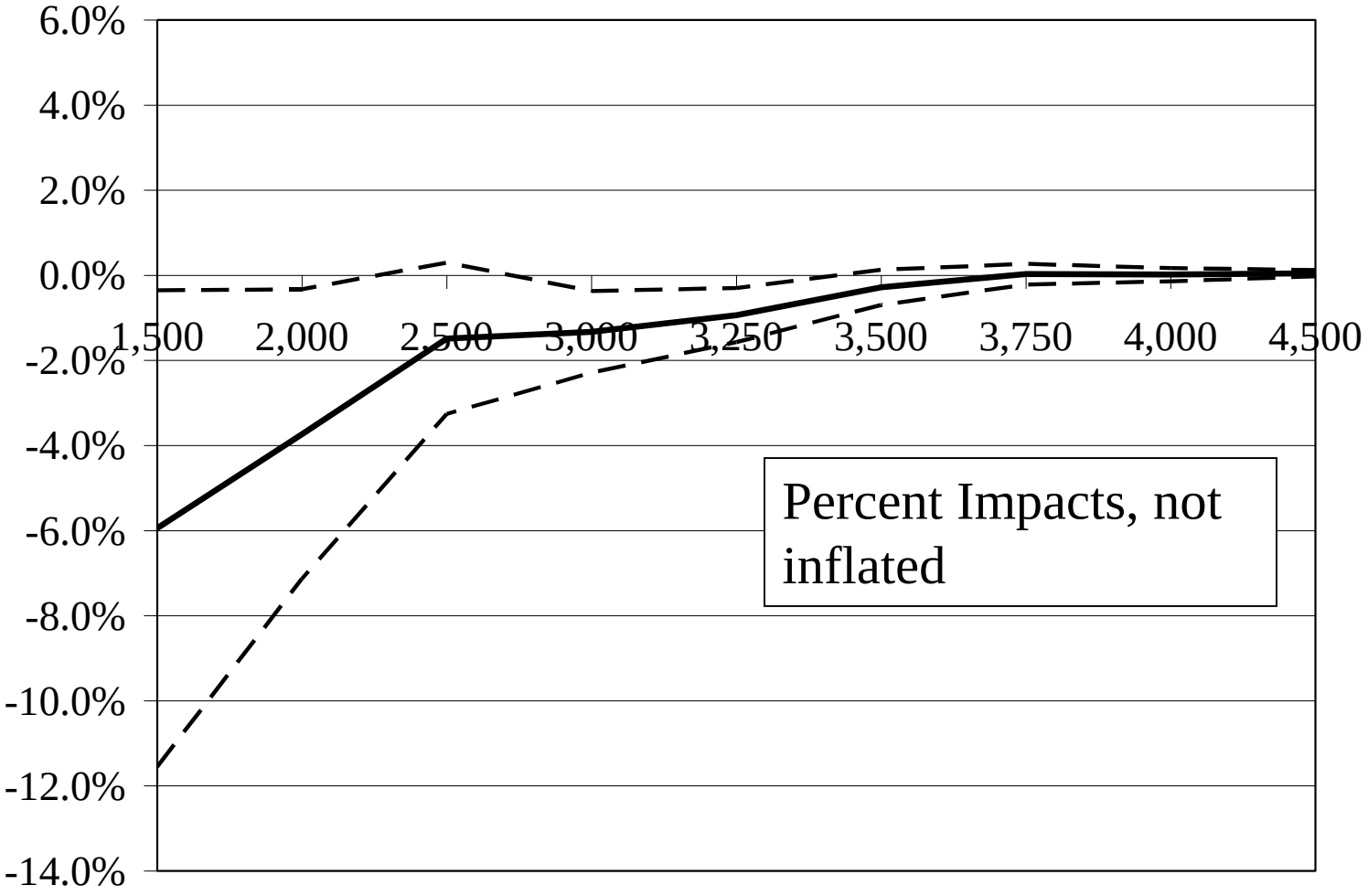
Larger point estimates for blacks; less precisely estimated.

Where are the gains in birth weight?
Impact of FSP on Distribution of Birth Weight (Whites)



Largest gains in the bottom of the birth weight distribution.

Where are the gains in birth weight?
Impact of FSP on Distribution of Birth Weight (BLACKS)



Results stratifying on 1970 county poverty rate: Show that effects are concentrated in highest poverty counties

	Low Poverty Counties (lowest quartile)		High Poverty Counties (highest quartile)	
	Birth weight (1)	LBW (2)	Birth weight (3)	LBW (4)
POOLED WHITES & BLACKS				
Ave FSP (0/1)	1.871	-0.001	3.409*	-0.0012*
	(2.013)	(0.001)	(1.750)	(0.0006)
% Impact (coef/mean)	0.06%	-1.23%	0.10%	-1.50%
Observations	8339	8339	56055	56055
R-squared	0.78	0.38	0.56	0.26
mean of dependant variable	3333	0.07	3303	0.08
Subsample Population	0.23	0.23	0.26	0.26
1960 CCDB * linear time	x	x	x	x
REIS controls	x	x	x	x
cty per cap real income	x	x	x	x
yr x qtr fixed effects	x	x	x	x
county fixed effects	x	x	x	x
state * year fixed effects	x	x	x	x

Are the magnitudes sensible?

- Average food stamp benefit for one-trimester "treatment" is about $525 (2009$). Treatment on the treated results suggest a 16 gram increase in birth weight impact and a 8% reduction in LBW for whites (results for blacks not significant)
  - Another calculation assuming ONLY benefits of FSP operates through infant health: implies $8 million per LBW birth averted
- The natural comparison is to a similar sized exogenous increase in income. Unfortunately, there is little evidence on the causal impact of income on birth weight and thus few comparisons
  - Currie & Cole (1993): use sibling differences to identify the impact of an increase in AFDC income on birth weight. Insignificant but larger estimates.
  - EITC and infant health (work in progress, with Doug Miller and David Simon) shows similar magnitudes as those presented here

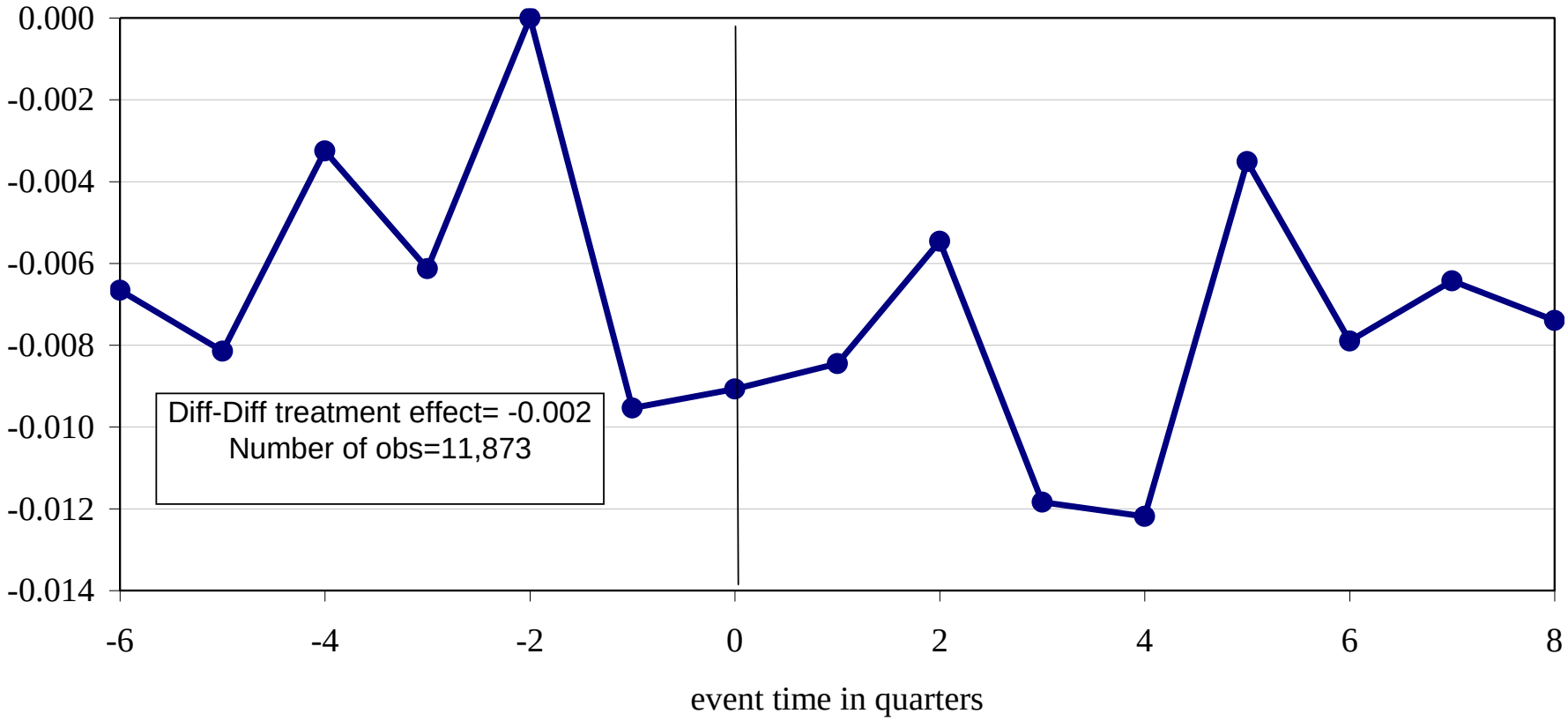
Other results

- Results by region (south/nonsouth) and urban/rural show much larger impacts in urban areas, and (for blacks) outside the South.
- Timing maters: results are consistent with FSP exposure mattering in 3rd trimester (with little marginal gain earlier in pregnancy).
- Results for pre-term birth (gestation<37 wks): FSP leads to small but detectable decrease in pre-term births for whites with statistically insignificant results for blacks.
- FSP leads to a decrease in the fraction of births that are female. While small and statistically insignificant, this is consistent with other work that finds nutritional depravation leads to a sex ratio imbalance favoring girls.

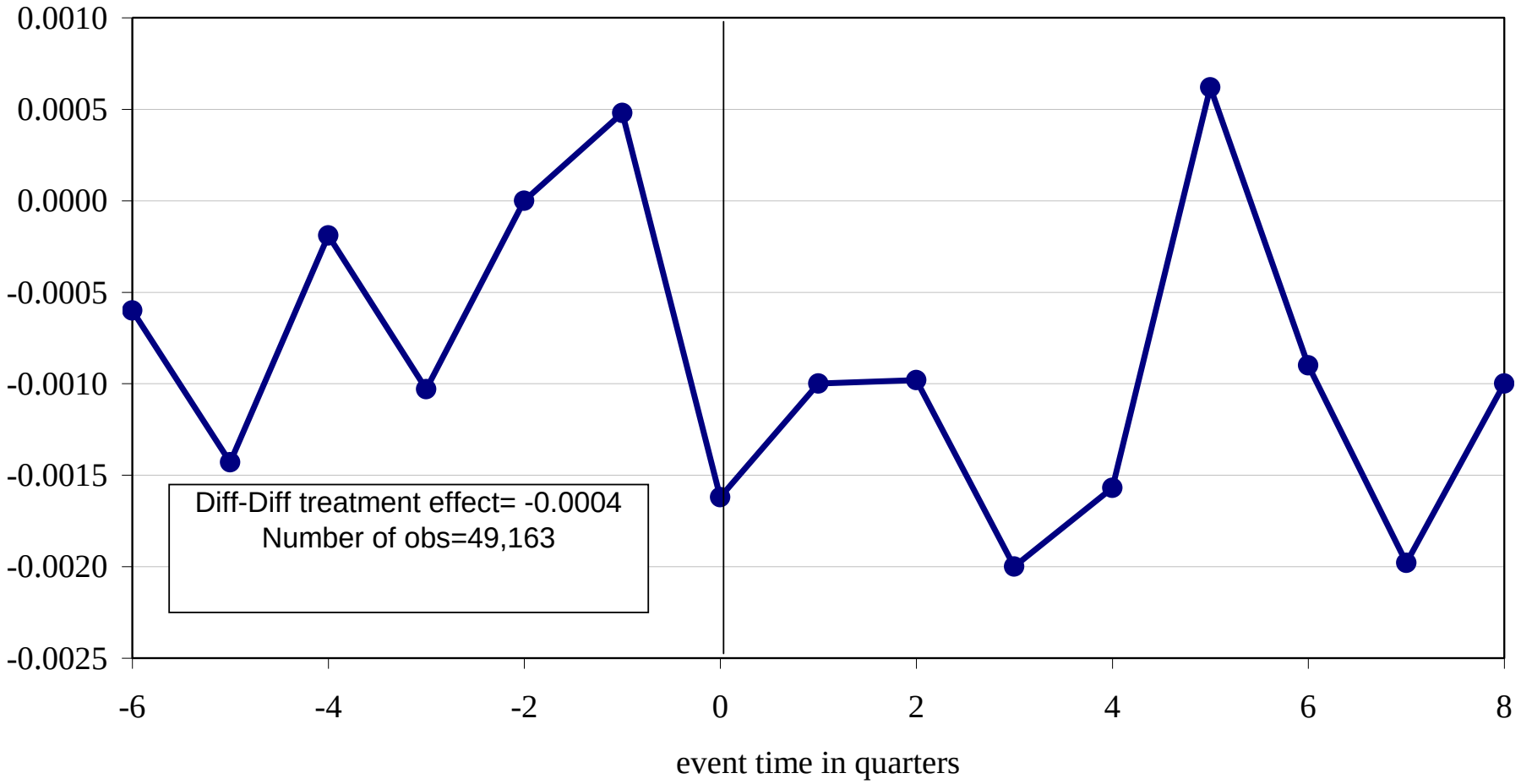
Event study analysis

- We also show estimates for an event study model. This allows us to examine the trends prior to FSP adoption, and also the changes in the effects of the FSP over time
- We estimate models with same controls as regressions but estimate a full set of parameters for FSP for periods prior to and after the adoption.
- We limit to counties that are observed for 6 quarters before adoption and 8 quarters after adoption (to create a balanced panel)
- We present event study for the most saturated model, with county * linear time.

Event Study Graphs – BLACKS, Fraction LBW (Fig 5)



Event Study Graphs – WHITES, Fraction LBW



Specification tests

- Large expansion in government spending on health during this time. We have no evidence that this biases our results:
  - Adding the REIS does not change the estimated effects.
  - We observe place of birth (hospital, whether physician attended the birth) and find that FSP has no impact on these outcomes.
- If FSP introduction changes fertility (especially composition of births) then the results could be biased.
  - Increase in births among disadvantaged? Increase in fetal survival?
  - We apply the same identification strategy to county-quarter birth rates and find precisely estimated small impacts on birth rate.

Summary of natality results

- Introduction of FSP leads to modest improvement in infant health: higher birth weight, lower fraction of births that are LBW
- Results robust across specifications; stand up to event study analysis
- No evidence that results are biased by changes in fertility
- Timing of FSP is key: results consistent with importance of third trimester treatment

Analysis of infant mortality

- Vital statistics data, micro data on deaths
- Data identifies state and county of residence, month of death, age at death, and detailed cause of death codes.
- Outcome:
  - neonatal infant mortality rate (in first 28 days)
  - "cohort" rate: neonatal deaths among those born in quarter t divided by live births in quarter t (natality micro data for births)
  - Neonatal deaths related to health during pregnancy/delivery so FSP assigned as of the beginning of the 3rd trimester
- We collapse data to the county-quarter level separately for whites and blacks
- Sample: 1968-1977
- Regressions weighted by number of births in cell, clustered on county. Drop cells with fewer than 50 births.

Classifying causes of death

	Cause of Death	ICD-7 Code (1959-1967)	ICD-8 Code (1968-1978)
1	Congenital Anomalies	750-759	740-759
2	Respiratory Distress	773	776.1,776.2
3	Disorders of short gestation and unspecified low birthweight	776	777
4	Infections specific to the perinatal period	53	038
5	Pneumonia and influenza	480-483, 490-493, 763	470-474,480-486
6	Newborn affected by maternal complications of pregnancy	n/a	769.0-769.2,769.4,769.5,769.9
7	Intrauterine hypoxia and birth asphyxia	762	776.9
8	Newborn affected by complications of placenta, cord, and membranes	761	770,771
9	Certain gastrointestinal diseases	045-048,543,571,572,764	004,006-009,535,561,563
10	Diseases of the heart	400-402,410-443	390-398,402,404,410-429
11	SIDS	NA	795.0
12	Accidents and adverse events	E800-E962	E800-E949
13	Birth trauma	760	764-768(.0-.3), 772
14	Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice*	770	774,775
15	All Other	all other codes	all other codes

Deaths possibly affected by nutritional deprevation

Other Deaths (not likely affected by nutrition)

Neonatal infant mortality, 1968-1977 deaths per 1000 births

	All Deaths	Deaths linked to Nutrition	Other Death
A. WHITES			
Ave FSP (0/1)	-0.0158	-0.0784	0.0626
	(0.1194)	(0.0839)	(0.0936)
% Impact (coef / mean)	-0.13%	-1.25%	1.09%
% Impact, inflated	-1.01%	-9.63%	8.39%
Observations	73,577	73,577	73,577
mean of dependent variable	12.00	6.26	5.74
B. BLACKS			
Ave FSP (0/1)	-0.0067	-0.3098	0.3032
	(0.4610)	(0.2953)	(0.3348)
% Impact (coef / mean)	-0.04%	-3.43%	3.06%
% Impact, inflated	-0.08%	-7.47%	6.65%
Observations	17,655	17,655	17,655
mean of dependent variable	18.94	9.02	9.91

No statistically significant impact on infant mortality. Point estimates suggest improvement in infant health; larger impacts for deaths linked to nutrition.

Results for FSP and Infant Health

- Across the board, FSP associated with improved health outcomes. Gradients are reasonable.
  - Natality results robust, statistically significant
  - Mortality results never statistically significant
- We conclude that despite not targeting pregnant women, the FSP improved birth weight
- Demonstrate the importance of thinking broadly about the potential benefits of transfer programs

"Childhood Exposure to the Food Stamp Program: Long-run Health and Economic Outcomes"

- We use the same policy variation—the county rollout of the food stamp program—to examine the impact of early life exposure to FSP on adult health and economic outcomes.

How might FSP affect adult outcomes? Early life "shocks" and later life outcomes

- Economic outcomes: Heckman's work argues that investment in early life leads to improvements in a model of human capital formation
- Health outcomes: Developmental biology argues for connection between fetal development and early "critical" periods and chronic conditions in adulthood
  - Events in early life "program" body for the type of environment likely to face
  - Example: Limited nutrition pre/post natal -> expect future state of world to have deprived nutrition -> body invokes (irreversible) biological mechanisms to adapt to predicted poor postnatal environment
  - If future world is *not* nutrient-deficient, maladapted to environment
  - Negative consequences onset after reproductive age (Barker 1992)

Predictions for FSP introduction

- Economic outcomes: increase in human capital (education, earnings)
- Adult health: Lack of nutrition → higher *metabolic syndrome:* high blood pressure, type 2 diabetes, obesity, cardiovascular disease
  - FSP leads to better nutrition → lower metabolic syndrome →lower incidence of obesity, high blood pressure
  - both pre- and post-natal nutrition can matter
- Note: these responses found even if birth weight unaffected
- Most of the existing studies focus on health shocks and pollution. There is little evidence using shocks to income.

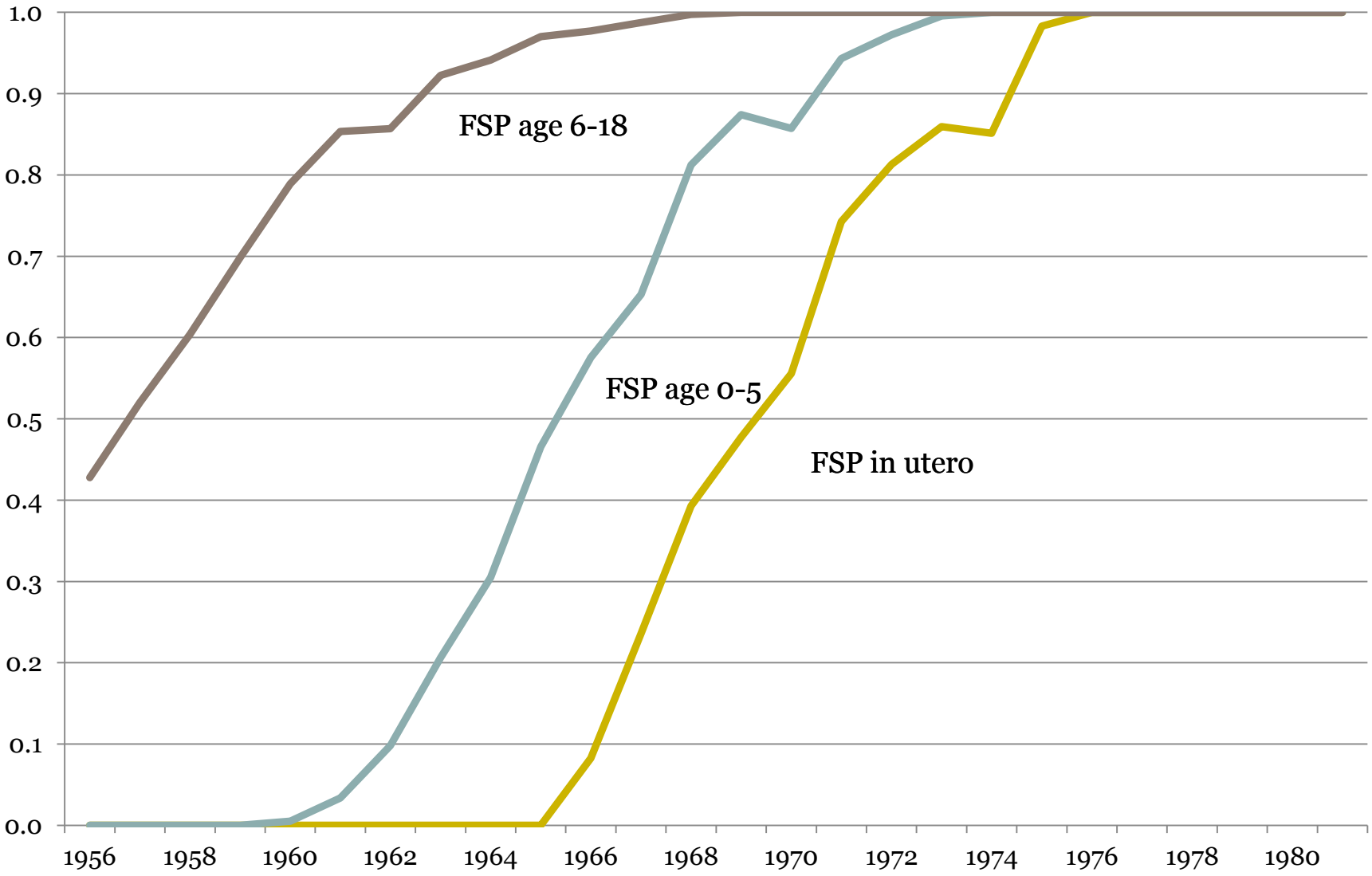
PSID Sample

- Heads and wives born between 1956-1981, health outcomes measured for ages 18-51 (or 24-51 for economic outcomes)
- County from geocode file (restricted data)
- Match adults to their families at birth/early life:
  - Assign county codes at birth
  - Assign family background : higher/lower risk of being impacted by FSP
- Outcomes:
  - General health status and disability (1984+), Diseases and weight (1999+), economic variables

Methods

- Similar difference-in-difference model as that used with the infant health; variation across counties and birth cohorts.
- Here we relate early life exposure to later life outcomes; we have to deal with the fact exposure can take place at different ages AND once the program turns on it does not turn off
- We start by using the share of months between 0 and age 5 that FSP is in place in your county
- We then present more flexible models in age of exposure (similar to an event study)

Cohort-Level Variation in Exposure



Health Outcomes
Full Sample: Difference in Difference

			"Metabolic Syndrome"						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	In good health =1	Disabled =1	Diabetes =1	High blood pressure =1	Obesity =1	Healthy weight =1	BMI	Body weight	Height
FS share age 0-5	0.041	-0.003	-0.001	-0.062	-0.088	0.108	-1.90	-12.23	-0.077
	(0.037)	(0.020)	(0.019)	(0.040)	(0.04)**	(0.050)**	(0.71)**	(5.07)**	(0.384)
Inflated by takeup rate	*0.408*	*-0.032*	*-0.008*	*-0.619*	*-0.877*	*1.080*	*-19.0*	*-122.3*	*-0.765*
Y-mean	0.69	0.09	0.04	0.12	0.23	0.42	26.66	174.95	67.73
Observations	50995	50993	16335	16335	17842	17842	17842	17847	18172
R-squared	0.13	0.08	0.11	0.14	0.19	0.22	0.25	0.38	0.62

- Half year increase in exposure (10pp) → increases good health by 0.4pp ATE or 4pp TOT
- Most right signed (improvement in health) but insignificant except weight

Economic Outcomes
Full Sample: Difference-in-Difference

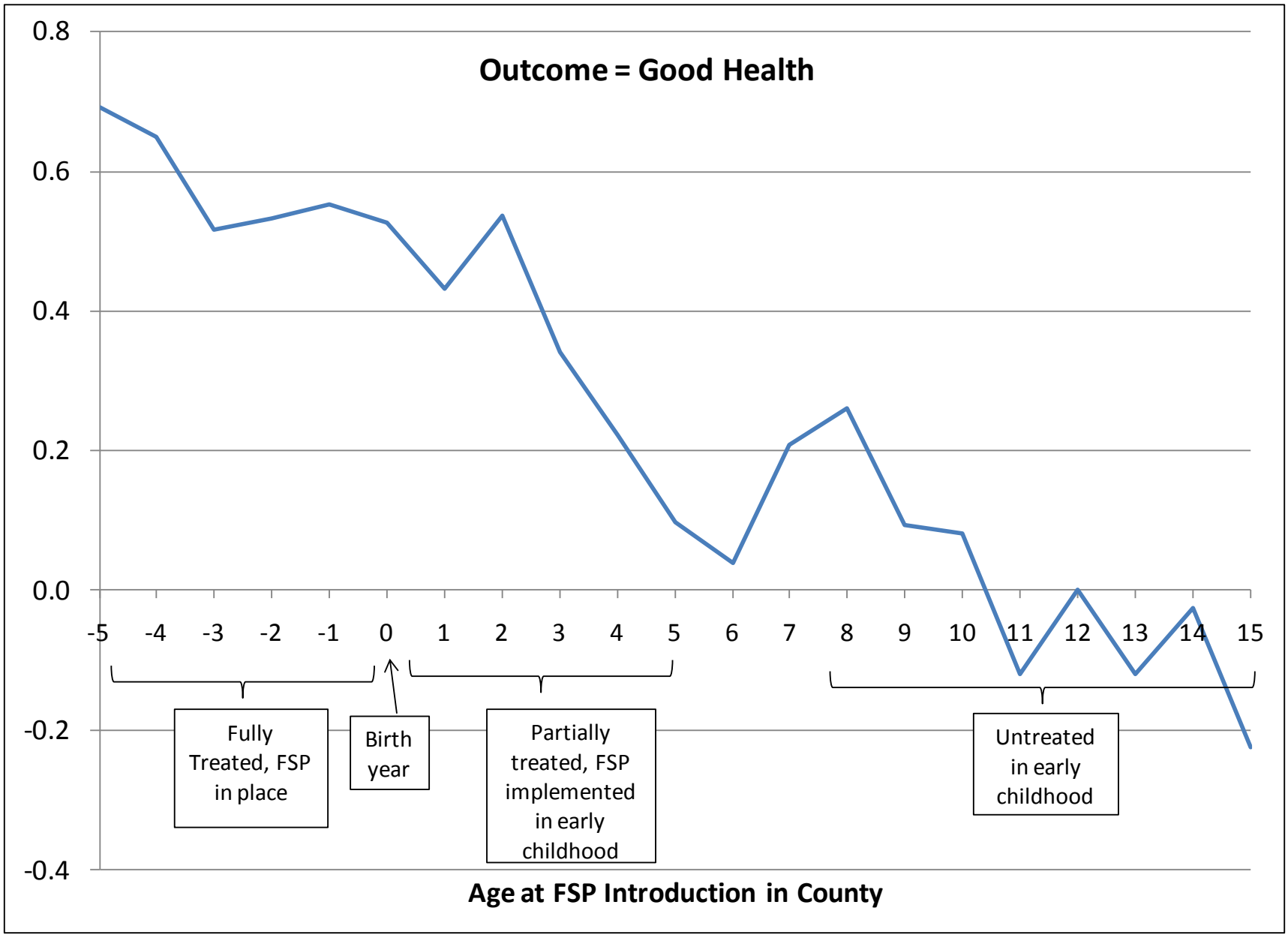
	(1)	(2)	(3)	(4)
	Educational Attainment: High School Plus	log(Family total income)	Employed =1	Poverty =1
FS share age 0-5	0.056	-0.039	0.006	0.000
	(0.045)	(0.071)	(0.028)	(0.032)
Inflated by takeup rate	*0.563*	*-0.394*	*0.063*	*0.005*
Y-mean	0.9	10.85	0.86	0.18
Observations	41397	41863	42047	41863
R-squared	0.24	0.37	0.09	0.23

- Mixed in sign (education increases, income decreases) but all insignificant

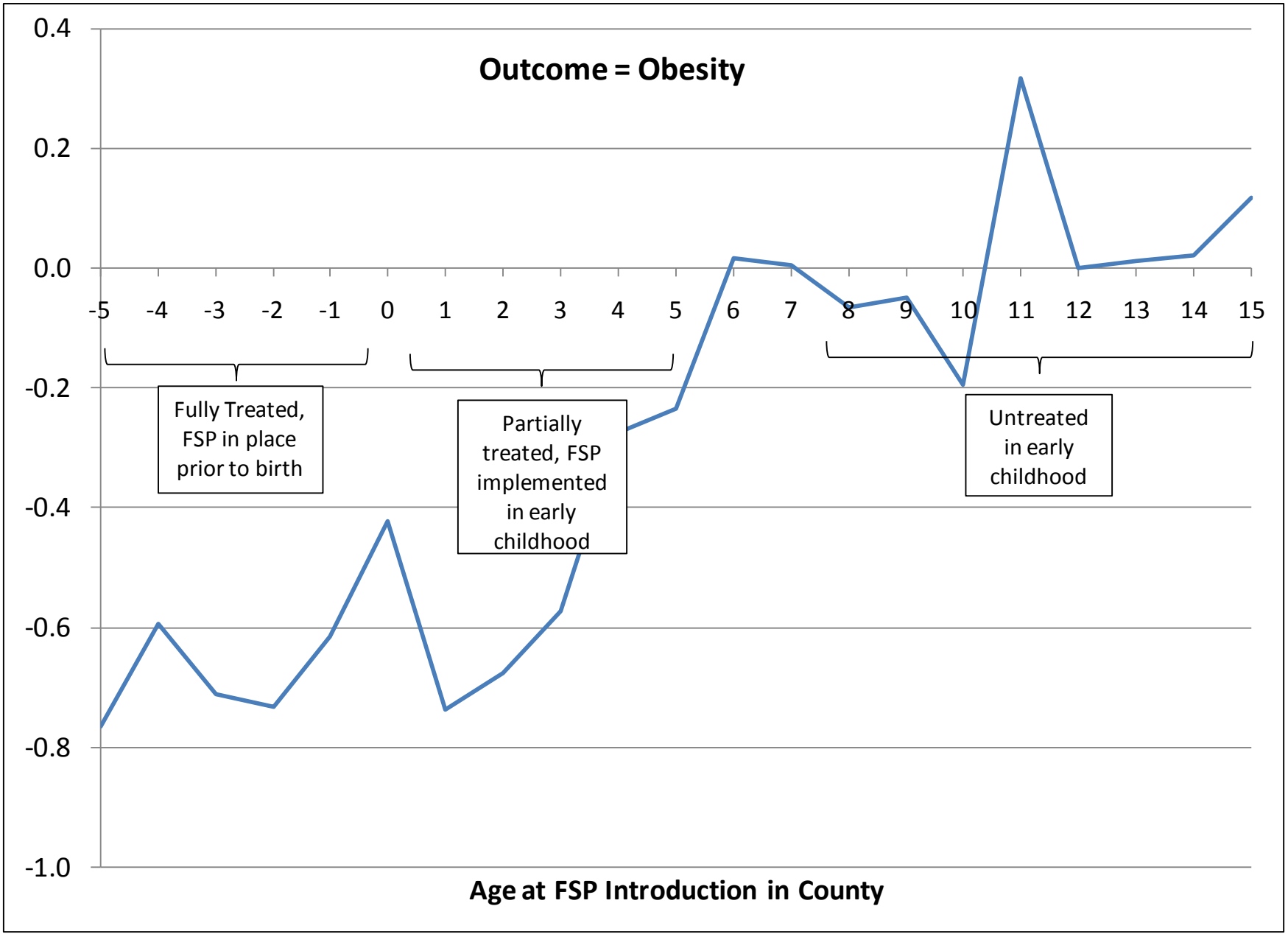
Other results

- We estimate models for subgroups more likely to be impacted: those born into families with low education head, female head → generally show larger impacts
- Placebo regressions on subgroups unlikely to get FSP (born into family with high education) → zero impact
- When we include in utero along with 0-5 exposure, the results tend to load onto 0-5. We probably do not have precision to identify in utero and % of childhood

Event Study: by age when FSP introduced (subgroup=female head)



Event Study: by age when FSP introduced (female head)



Triple Difference

- The challenge with the PSID is small sample sizes; we want to use a broad sample but many subgroups have low probability of being affected by the FSP
- Solution: Pool all data, but scale by higher/lower probability of being impacted by the program
- Define group-specific participation rate Pg using family background (race, education, and marital status of head)
- Interact FSP indicator with participation rate

$$y_{ict} = \alpha P_g + \varphi FSP_{ct} + \delta FSP_{ct} P_g + X_{it}\beta + \gamma_1 Z_{c60} * t$$

$$+\gamma_2 TP_{ct} + \theta_g + \theta_g * t + \eta_c + \lambda_t + \varepsilon_{ict}$$

DDD: Health Outcomes interacted w/Part Rate

			"Metabolic Syndrome"				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	In good health =1	Disabled =1	Diabetes =1	High blood pressure =1	Body Weight	BMI	Obesity
FS Share age 0-5 * Pg	0.186**	-0.071	-0.152*	-0.195*	-17.000	-2.469	-0.246**
	(0.091)	(0.056)	(0.093)	(0.100)	(14.605)	(1.779)	(0.120)
FS share age 0-5	0.026	0.002	0.010	-0.047	-11.90**	-1.87**	-0.079*
	(0.040)	(0.022)	(0.019)	(0.041)	(5.449)	(0.756)	(0.046)
Y-mean	0.69	0.09	0.04	0.12	174.91	26.66	0.23
Observations	50,673	50,671	16,251	16,251	17,750	17,745	17,745
R-squared	0.13	0.09	0.11	0.15	0.39	0.26	0.2

- Pool all data, but scale by higher/lower probability of being impacted by FSP (coef are TOT)
- Consistent positive effects, many results reach statistical significance

DDD: Economic Outcomes interacted w/ Part Rate

	(1)	(2)	(3)	(4)	(5)
	High School Plus	log(Family total income)	Earnings	Employed =1	Poverty =1
FS Share age 0-5 * Pg	-0.086	0.582**	10718	0.038	-0.183*
	(0.108)	(0.254)	(13386.4)	(0.079)	(0.104)
FS share age 0-5	0.083	-0.055	-7634	0.004	0.004
	(0.046)	(0.072)	(4564.0)	(0.028)	(0.031)
Y-mean	0.90	10.85	35131	$0.86	$0.18
Observations	41,115	41,569	40,617	41,750	41,569
R-squared	0.24	0.37	0.11	0.09	0.24

Research agenda and implications for policy

- In this work, we show that the food stamp program leads to improvements in health
- The work illustrates the importance of taking a wide view of the potential benefits of transfer programs
  - Health benefits for non-health programs
  - Long run benefits of early life program participation
- This work does not (yet) provide guidance on the relative benefits of cash (e.g. TANF), tax (e.g. EITC) or near-cash (e.g. FSP) programs. Why? Because of the lack of similar estimates for these programs. Stay tuned …

Conclusions

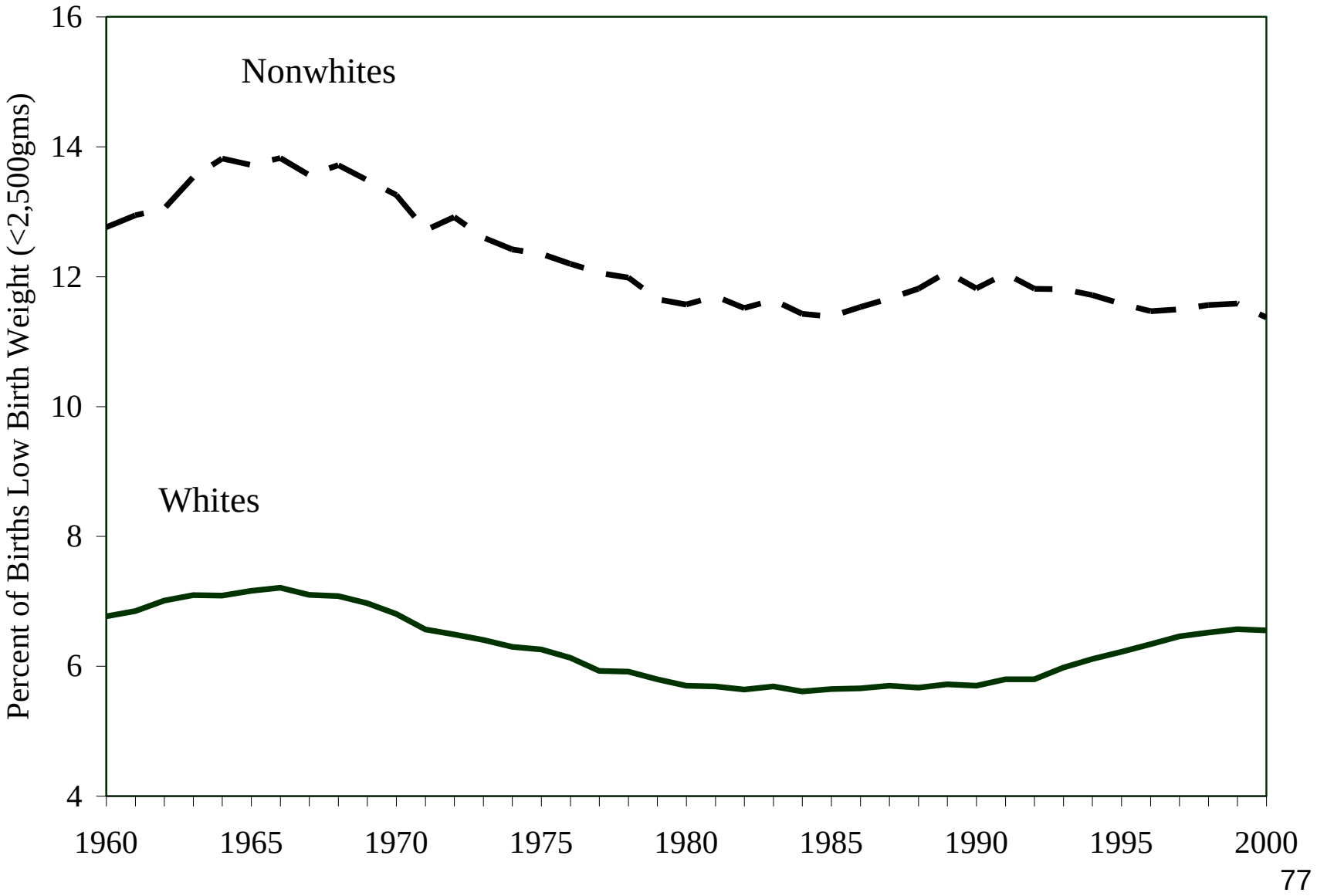
- The food stamp program is a very important component of the U.S. safety net and we know very little about impacts on family and child well-being
- We use a novel source of variation: the introduction of the food stamp program across counties over 1961-1975
- Across the board, FSP associated with improved infant health outcomes
- Further, childhood exposure to the FSP leads to improvement in adult health, with strongest results for body weight
- Expansion of the safety net, exogenous increase to income in early life improves infant and adult health
- Illustrates the importance of a wide scope to evaluating the benefits of cash transfer programs (or government policies more generally)

SUPPLEMENTAL SLIDES

Table 1: Determinants of County FSP Start Date

% land in farming	0.205***	0.216***
	(0.027)	(0.033)
% population with income < $3,000	-0.122	0.422***
	(0.096)	(0.154)
% population urban	-0.255***	-0.180***
	(0.035)	(0.047)
% population black	-0.435***	-0.912***
	(0.072)	(0.141)
% population <5	-3.917***	-5.521***
	(0.635)	(0.826)
% population >65	-1.326***	-3.689***
	(0.395)	(0.551)
South * % land in farming		-0.177***
		(0.061)
South * % population with income <$3,000		-0.742***
		(0.203)
South * % population urban		-0.075
		(0.073)
South * % population black		0.700***
		(0.166)
South * % population <5		2.612**
		(1.321)
South * % population >65		4.212***
		(0.806)
State Fixed Effects	X	X
Adjusted R-squared	0.52	0.53
Number of Observations	2,823	2,823

Trends in fraction of births LBW



Is there sufficient across county variation within states?

Years 1961-1975

Graphs by State

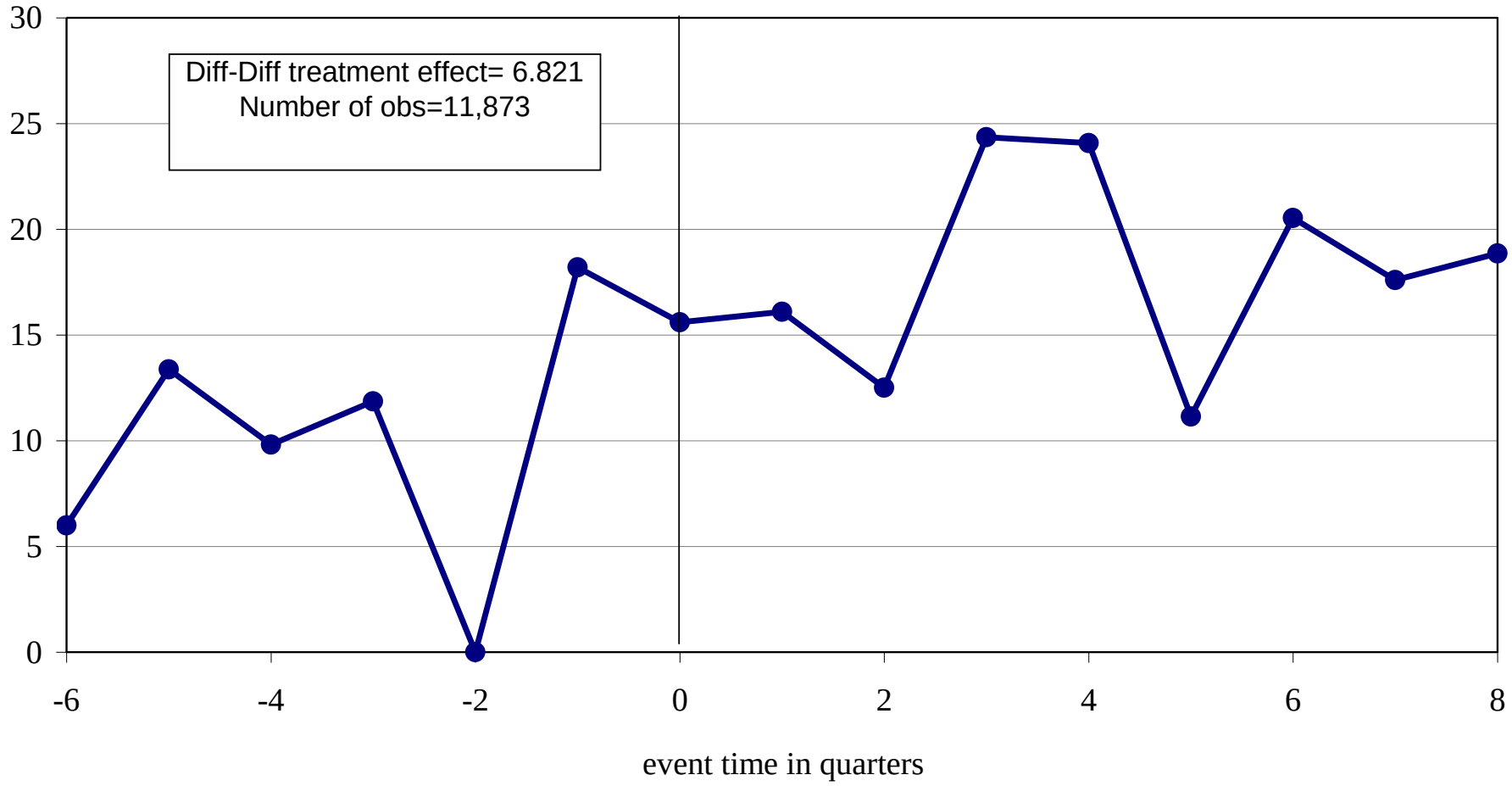
Prior evidence on FSP and infant health

- Currie and Moretti (2007) examine impact of county rollout of FSP on birth outcomes in California
- Assign FSP as of 9 months before birth
- Highlight the fact that there are competing effects on birth outcomes
  - Fetal deaths fell 30% from 1965-1975
  - Selection versus inframarginal effect
- Find that FSP increased incidence of low birth weight, esp. in LA
- Raised concern that research design applied to CA may be confounded by rural-urban migration and composition change in fertility during this time period

Importance of timing of FSP implementation (Birth weight)

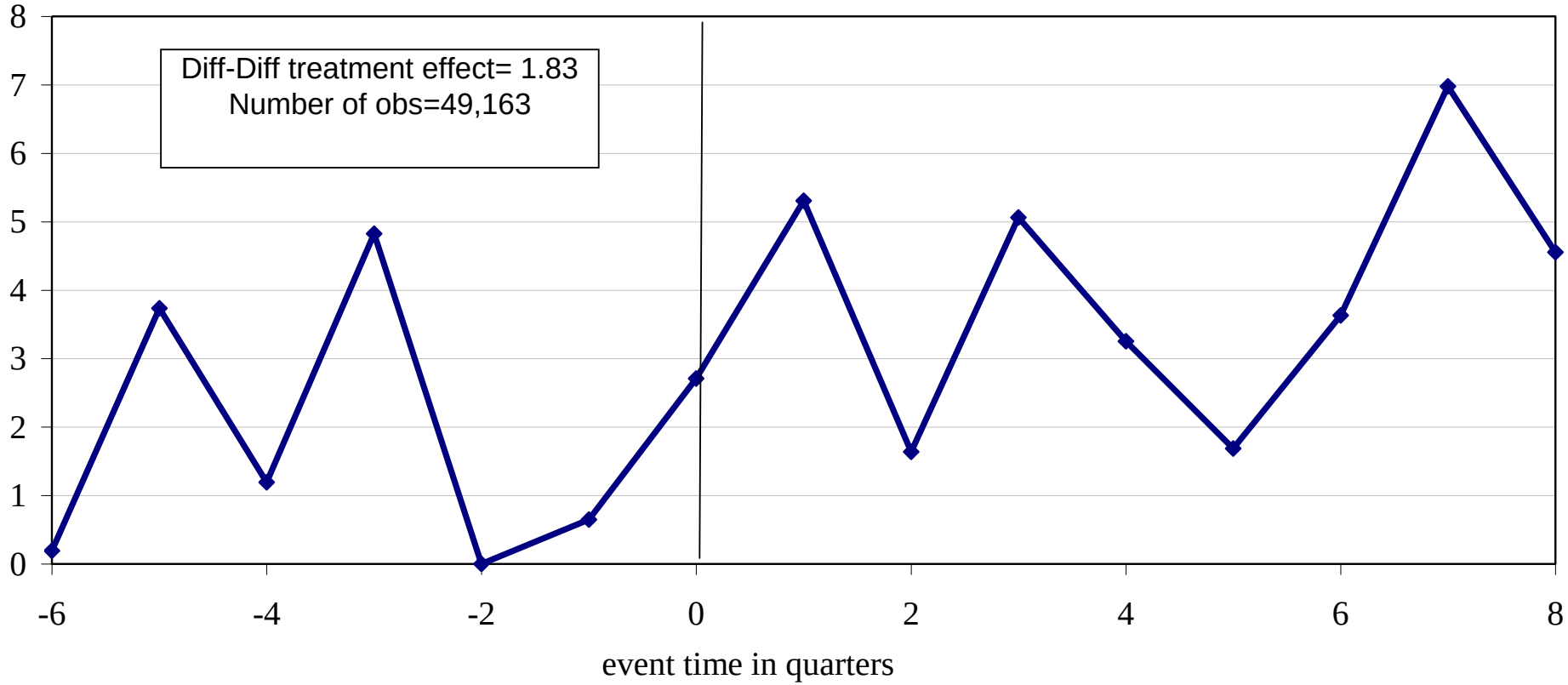
	Birthweight				
MAIN POLICY EFFECT:	FSP-beg of 3rd trimester	FSP-beg of 2nd trimester	FSP-beg of 1st trimester	FSP-beg of 3rd trimester	FSP-beg of 3rd trimester
SECOND POLICY EFFECT:	--	--	--	FSP-beg of 2nd trimester	FSP-beg of 1st trimester
	(1)	(2)	(3)	(4)	(5)
A. WHITES					
Ave FSP (0/1)	2.085	1.696	1.288	2.556	2.434
	(1.020)**	(1.024)*	(0.993)	(1.640)	(1.268)*
Ave FSP (0/1)	--	--	--	-0.533	-0.454
SECOND POLICY VAR				(1.650)	(1.232)
B. BLACKS					
Ave FSP (0/1)	5.447	4.704	2.071	5.334	8.108
	(2.532)**	(2.464)*	(2.396)	(4.596)	(3.444)**
Ave FSP (0/1)	--	--	--	0.130	-3.515
SECOND POLICY VAR				(4.450)	(3.268)
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	x
yr x qtr fixed effects	x	x	x	x	x
county fixed effects	x	x	x	x	x
state * year fixed effects	x	x	x	x	x

Event Study Graphs – BLACKS, Birth weight



Trend break in birth weight at FSP introduction; no evidence of pre-trending

Event Study Graphs – WHITES, Birth weight



Noisier for whites.

Results by region / urban

	SOUTH		NONSOUTH		URBAN COUNTIES		NONURBAN COUNTIES	
	Birthweight (1)	LBW (2)	Birthweight (3)	LBW (4)	Birthweight (5)	LBW (6)	Birthweight (7)	LBW (8)
A. WHITES								
Ave FSP (0/1)	2.403	-0.0011	1.771	-0.0003	2.364	-0.0008	0.508	-0.0002
	(1.612)	(0.0005)**	(1.322)	(0.0004)	(1.247)*	(0.0004)**	(1.615)	(0.0006)
% Impact (coef/mean)	0.07%	-1.57%	0.05%	-0.48%	0.07%	-1.13%	0.02%	-0.25%
Observations	44194	44194	53591	53591	32282	32282	65503	65503
Subsample Population	0.29	0.29	0.69	0.69	0.73	0.73	0.25	0.25
B. BLACKS								
Ave FSP (0/1)	3.527	-0.0023	7.003	-0.0009	8.371	-0.0034	-0.745	0.0023
	(3.134)	(0.0014)*	(3.992)*	(0.0022)	(2.846)**	(0.0013)**	(5.219)	(0.0023)
% Impact (coef/mean)	0.11%	-1.76%	0.23%	-0.69%	0.27%	-2.59%	-0.02%	1.74%
Observations	20837	20837	6537	6537	13090	13090	14284	14284
Subsample Population	0.49	0.49	0.45	0.45	0.77	0.77	0.17	0.17

Effects concentrated in urban areas.

Small positive and insignificant effect of FSP on fertility
[Births per 1000 women aged 15-44, 1968-1977]

	FSP implemented as of X quarters prior to birth				
	3 qtrs (1)	4 qtrs (2)	5 qtrs (3)	6 qtrs (4)	7 qtrs (5)
A. WHITES	0.013	-0.004	0.007	0.031	0.035
Ave FSP (0/1)	(0.078)	(0.074)	(0.071)	(0.074)	(0.070)
% Impact (coef/mean)	0.06%	-0.02%	0.04%	0.16%	0.18%
B. BLACKS	0.211	0.157	0.276	0.307	0.227
Ave FSP (0/1)	(0.221)	(0.206)	(0.193)	(0.190)	(0.183)
% Impact (coef/mean)	0.80%	0.60%	1.05%	1.17%	0.86%
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	x
yr x qtr fixed effects	x	x	x	x	x
county fixed effects	x	x	x	x	x
state * year fixed effects	x	x	x	x	x
Observations (whites)	120293	120293	120293	120293	120293
mean of dependant variable (whites)	19.40	19.40	19.40	19.40	19.40
Observations (blacks)	44044	44044	44044	44044	44044
mean of dependant variable (blacks)	26.24	26.24	26.24	26.24	26.24

Health Outcomes
Target sample: Family Background, head w/ Low Ed

			"Metabolic Syndrome"					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	In good health =1	Disabled =1	Diabetes =1	High blood pressure =1	Body Weight	BMI	Obesity = 1	Height
FS share age 0-5	0.072	0.006	-0.013	-0.083	-14.07	-2.413	-0.177	-0.187
	(0.065)	(0.035)	(0.041)	(0.082)	(9.646)	(1.14)**	(0.08)**	(0.845)
Inflated by takeup rate	***0.35***	***0.03***	***-0.06***	***-0.40***	***-68.63***	***-11.77***	***-0.86***	***-0.91***
Y-mean	0.59	0.11	0.05	0.17	182.26	28.04	0.31	67.46
Observations	24039	24034	6715	6715	7540	7537	7537	7682
R-squared	0.16	0.13	0.19	0.22	0.43	0.34	0.26	0.64

- Isolate group more likely to be affected by FSP
- Shows consistent health improvements, only bodyweight is significant

Economic Outcomes
Target sample: Family Background, head w/ Low Ed

	(1)	(2)	(3)	(4)	(5)
	Educational Attainment: High School Plus	log(Family total income)	Earnings	Employed =1	Poverty =1
FS share age 0-5	0.169	0.145	1605	0.012	-0.043
	(0.110)	(0.157)	4425	(0.053)	(0.067)
Inflated by takeup rate	*0.824*	*0.706*	*7830*	*0.058*	*-0.212*
Y-mean	0.8	10.52	24654	0.84	0.31
Observations	19572	19650	19065	19776	19650
R-squared	0.27	0.4	0	0.15	0.3

- Isolate group more likely to be affected by FSP
- Shows consistent beneficial effects of FSP, imprecise

Placebo Test:
Family background w/ head high education

		"Metabolic Syndrome"					Economic Outcomes		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	In good health =1	Diabetes =1	High blood pressure =1	Obesity =1	BMI	Body weight	High School Plus	log(Family total income)	Employed = 1
FS share age 0-5	0.006	0.002	-0.061	-0.016	-0.799	-5.4	-0.031	-0.021	0.109
	(0.060)	(0.029)	(0.058)	(0.082)	(1.165)	(9.7)	(0.049)	(0.122)	(0.038)
Y-mean	0.78	0.02	0.07	0.15	25.35	168	0.98	11.15	0.88
Observations	11,555	4,363	4,364	4,638	4,638	4,638	9,534	9,789	9,810
R-squared	0.16	0.22	0.19	0.30	0.40	0.55	0.34	0.35	0.12

- Shows small and generally wrong signed results