Income, The Earned Income Tax Credit, and Health at Birth

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Project summary

- We seek to illustrate and quantify the potential for health impacts of non-health programs
- We examine the health impacts of the EITC; in particular the effect on birth outcomes
- This work speaks to the broad interest in the relationship between socio-economic status, income and health
  - Use the EITC as a plausibly credible source of exogenous variation in income.

Main Identification Strategy

- Single policy expansion (OBRA93), comparison across family sizes
- Event study analysis of OBRA93, examine pre-trend

As an extension we also pool data covering multiple policy expansions, comparing across family sizes.

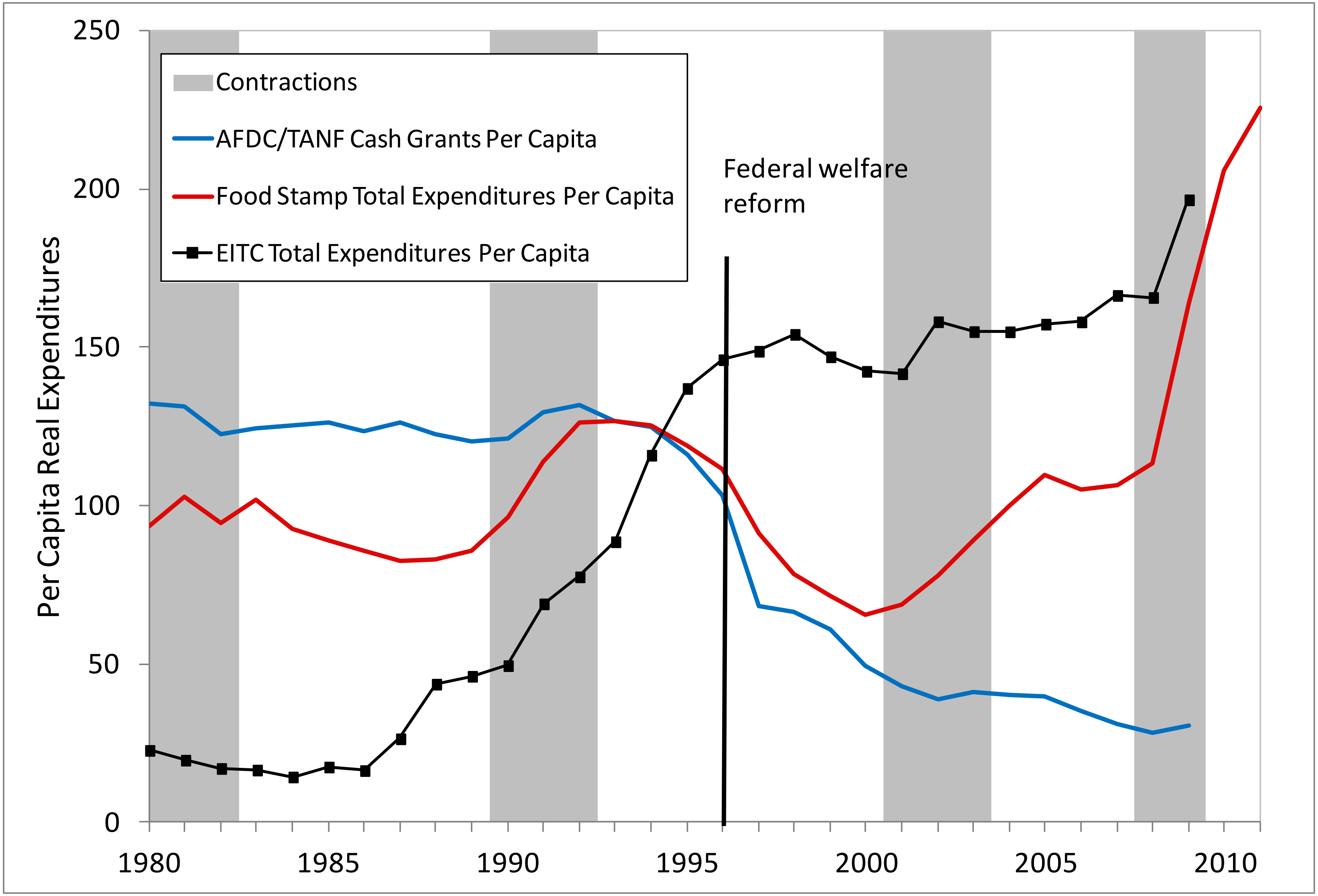
Plan for talk

1. Background: EITC changes; mechanisms; connections to prior work; Features of the EITC $\rightarrow$ research design
2. Data; Empirical models; assigning "treatment"
3. Results
4. Evidence on mechanisms
5. Threats to the design; robustness
6. Magnitudes; benefits of the EITC

Background on the EITC

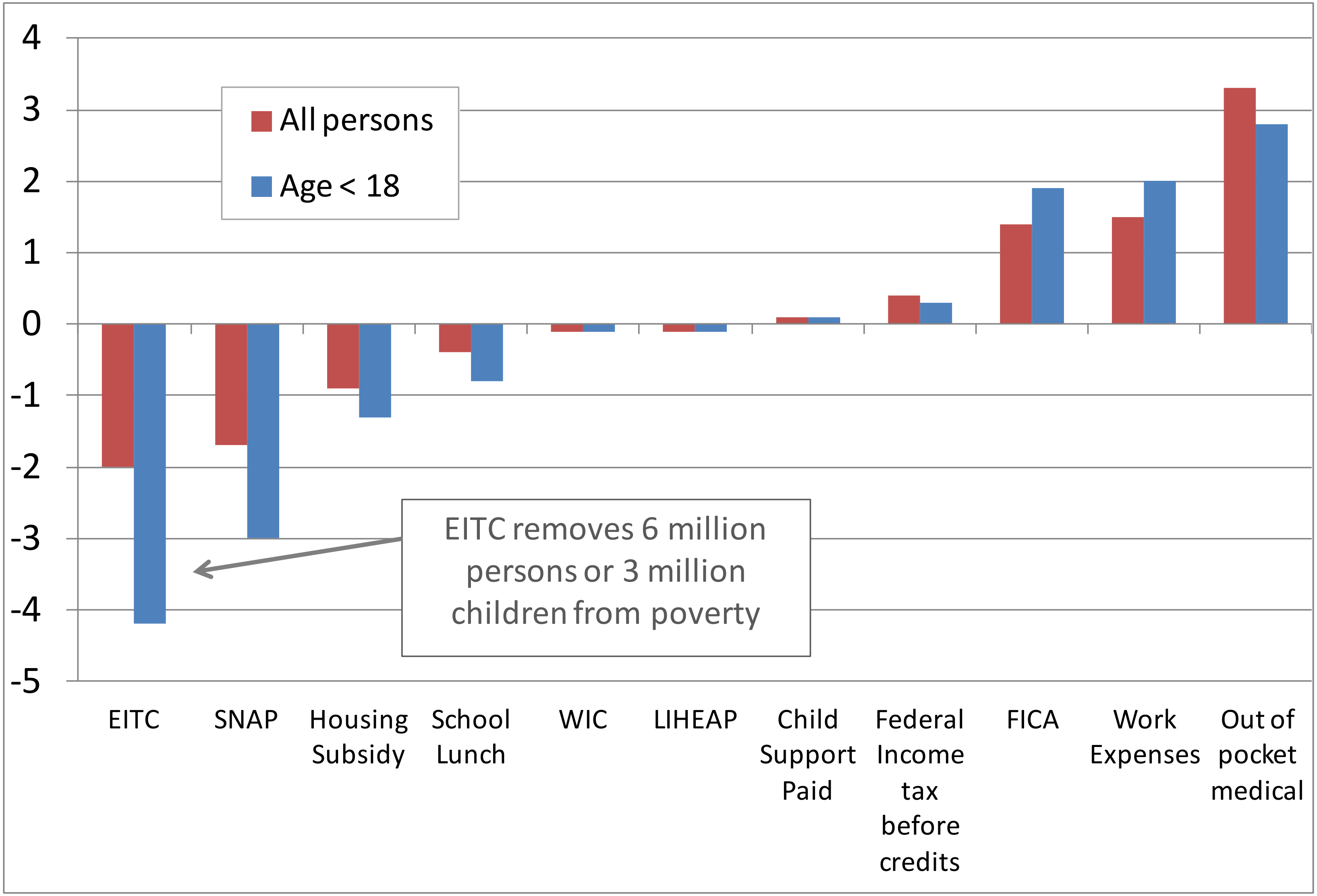
- Refundable tax credit for low income families
- Must have earned income to be eligible
- Credit varies by number of children (small credit for childless) and earnings
- In tax year 2009, the credit was received by 27 million filers at a cost of $59 billion (average credit of $2194)
- The EITC is a central piece in the safety net for low income families.
  - In 2009 Food Stamps $55 Billion, TANF $9 Billion

Cash and Near Cash Safety Net Spending per Capita, 2009$

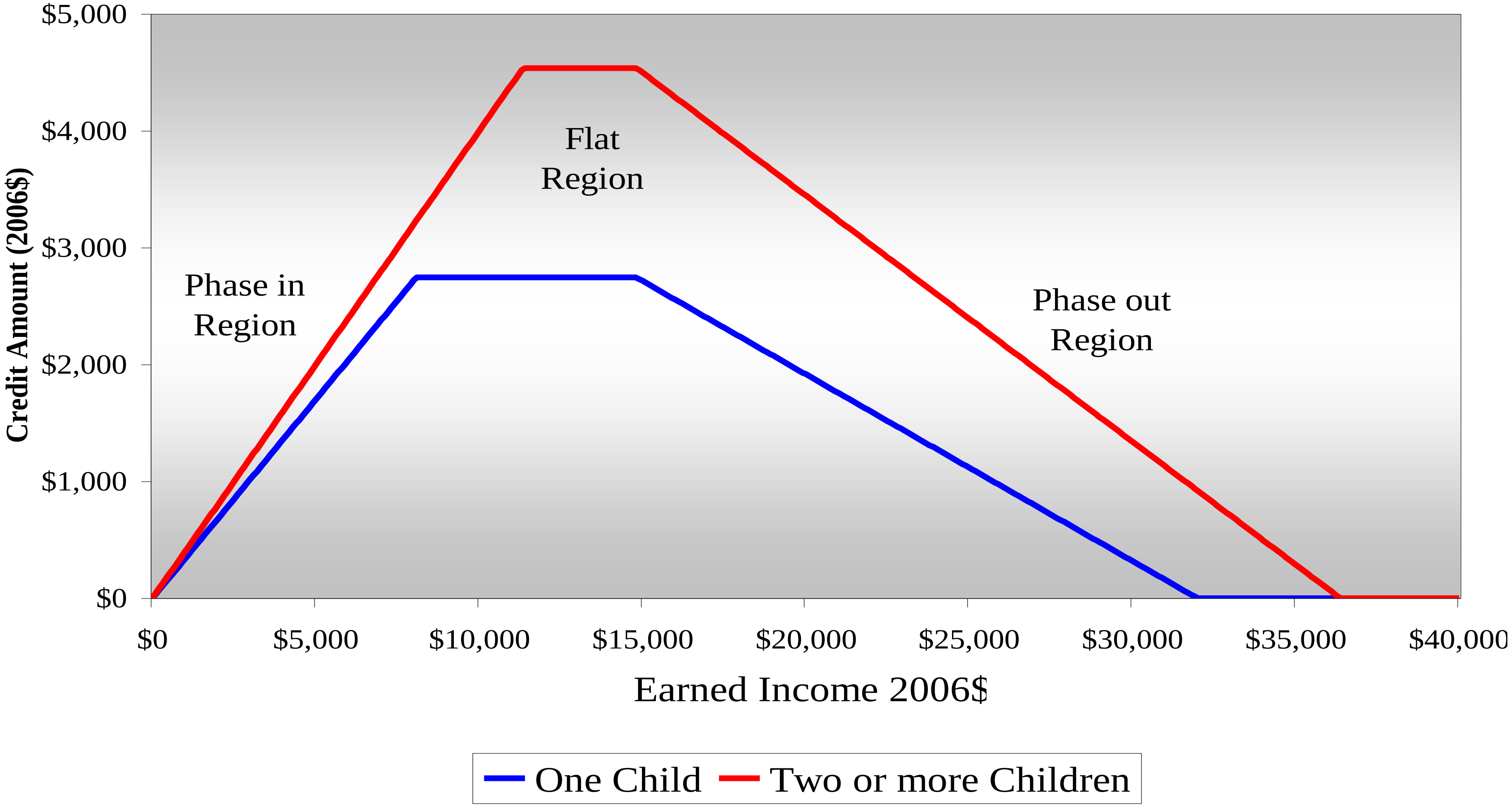


The EITC is the largest anti-poverty program

Effect of removing resources on supplemental poverty rate



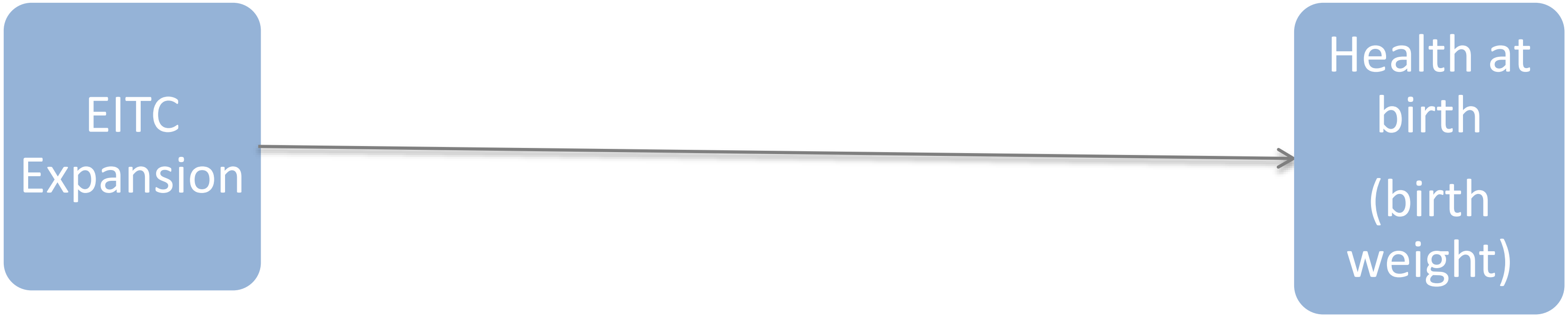
EITC Schedule



EITC, Income and Incentives

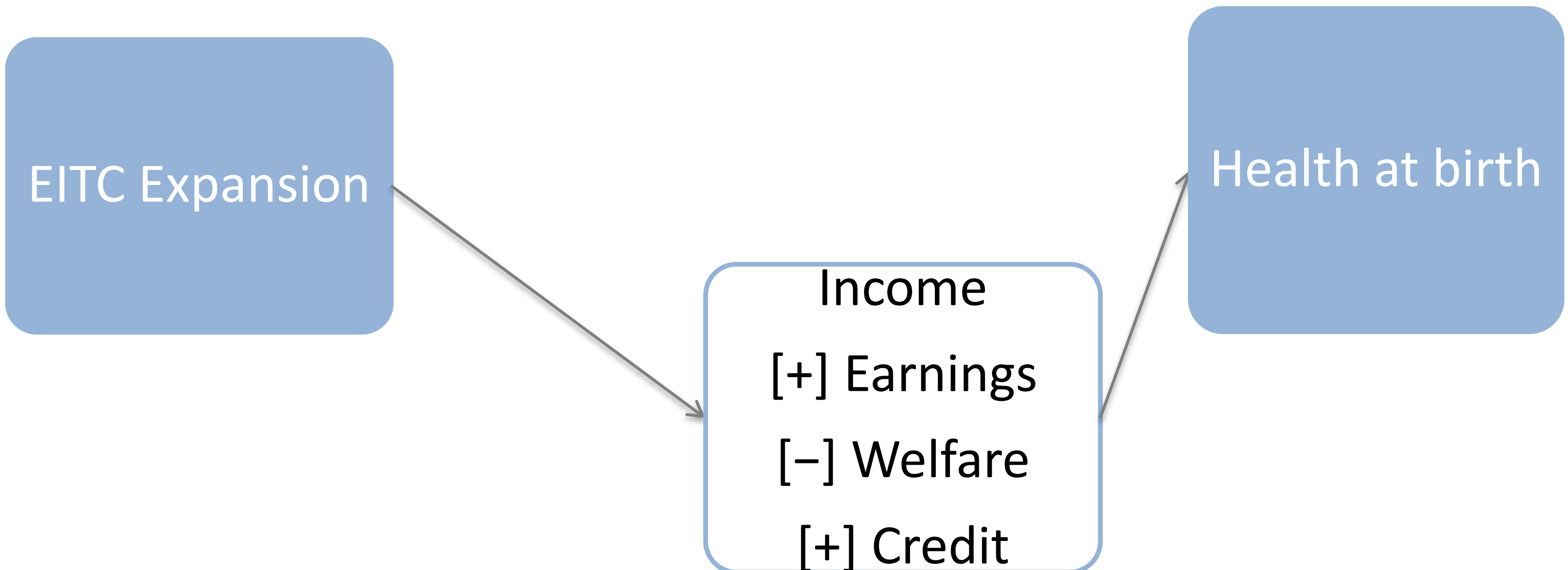
- EITC leads to increase in after-tax income through a tax refund
- The EITC requires earned income → for single earners incentivizes employment (but negative intensive margin expected)
  - Eissa and Leibman 1996, Meyer and Rosenbaum 2001, many others
- The EITC increases with number of children → may incentivize fertility (but more work may lead to opposite prediction)
  - Weak and small impacts on fertility (Baughman and Dickert-Conlin, 2009)
- Complex incentives for marriage (depends on who has the children and who has the earnings)
  - Weak and small impacts on marriage (Eissa and Hoynes 2004, Dickert-Conlin 2002, Ellwood 2000, Herbst 2011)

Possible channels: EITC and Infant Health



Possible channels: EITC and Infant Health

1. Impact of income

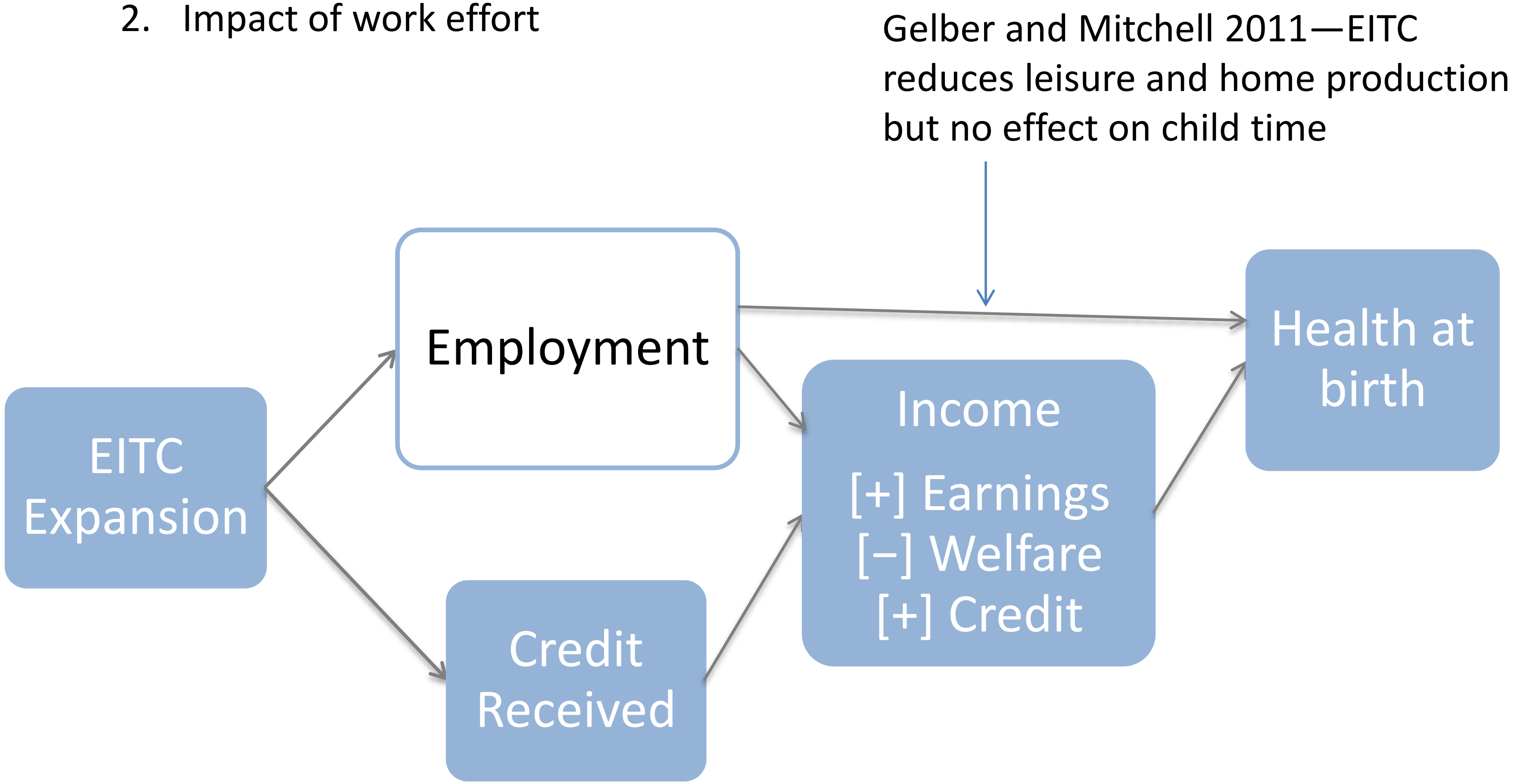


<u>Potential Mechanisms:</u>

Reduced maternal stress
(Evans and Garthwaite 2010)
Other health inputs (pos. or neg.)
Access to prenatal care

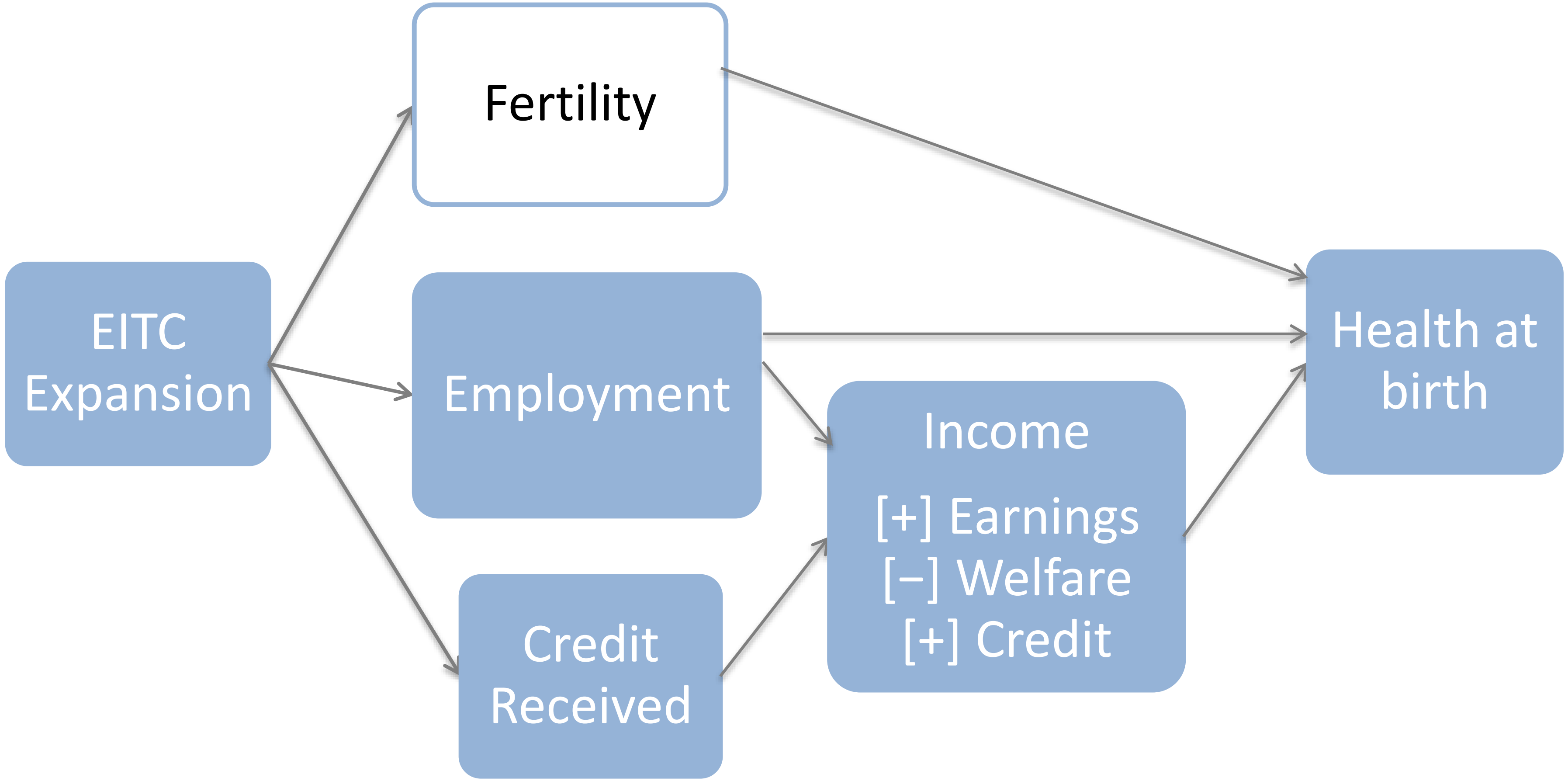
Possible channels: EITC and Infant Health

1. Impact of income
2. Impact of work effort



Possible channels: EITC and Infant Health

1. Impact of income
2. Impact of work effort
3. Selection into fertility



Related prior work on EITC

- Child care and work expenses (Patel 2011, Gao et al 2009)
- Vehicles (Adams, Einav & Levin 2009)
- Concentrated in month of refund (Barrow and McGranahan, 2000)

- Maternal health (Evans and Garthwaite 2010)
- Child test scores (Dahl and Lochner 2011)

EITC and infant health

- Baker (2008): DD, OBRA 1993
- Strully et al (2010): State EITC

- We build on these studies by:
  - Using multiple identification strategies
  - Ability to analyze full EITC expansion period
  - Analyzing validity of design through event time analysis
  - Take advantage of differences in exposure to EITC across groups
  - Test for contemporaneous changes in composition of births

Prior Evidence: Income and health

- Strong income-health correlation but hard to identify exogenous income.

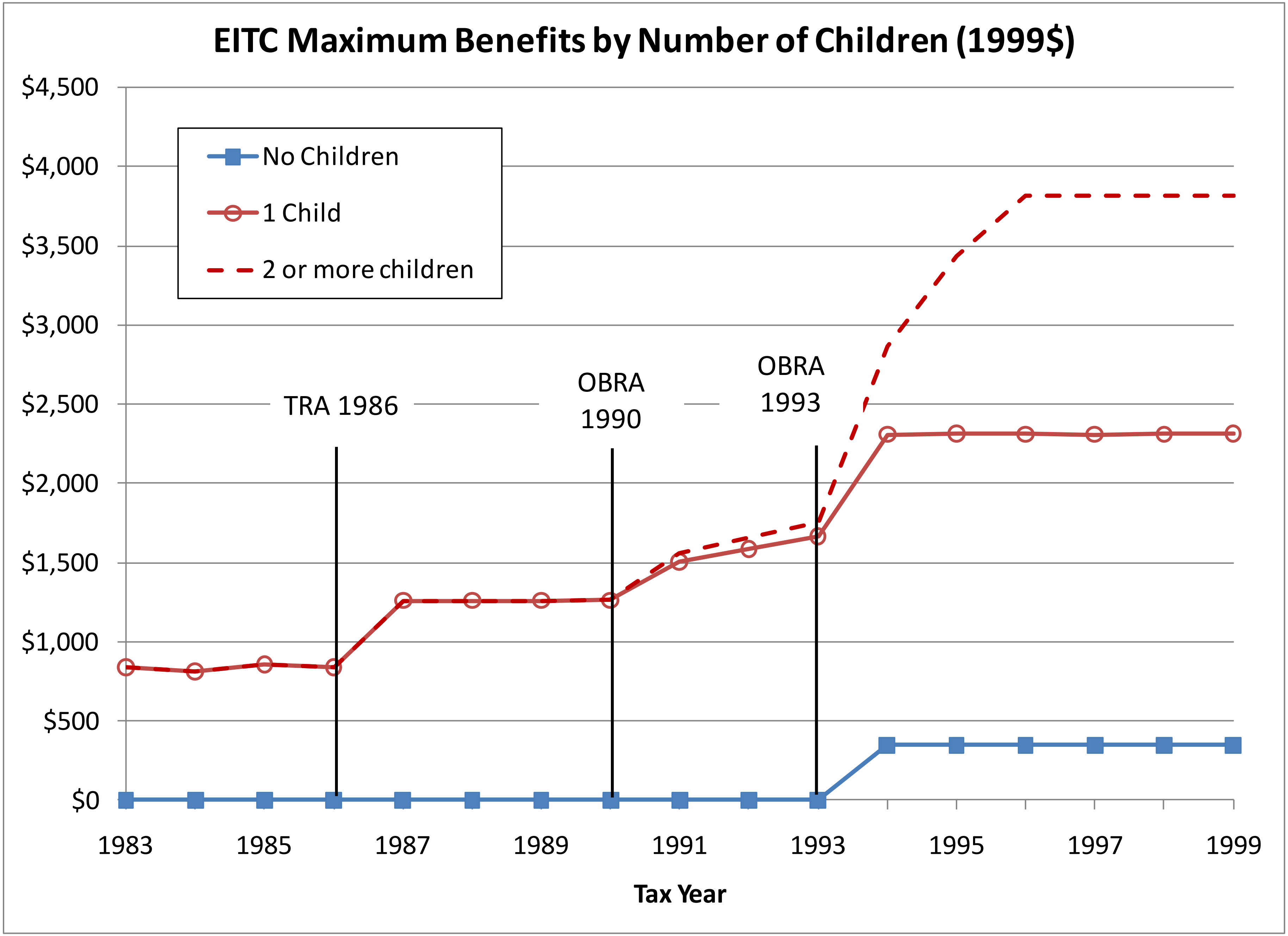
- Impacts on adult mortality using shocks to income: Social security payments (Snyder and Evans 2005), South African pensions (Case 2004), inheritance (Meer, Miller and Rosen, 2003), agricultural income (Banerjee et al., 2007), others.

- Income support programs and infant health:
  - Food stamp rollout leads to increase in income (Hoynes and Schanzenbach 2009) and improvement in infant health (Almond, Hoynes and Schanzenbach 2011).
  - Currie and Cole (1993) find no significant effects of AFDC income on infant health (sibling FE).
  - Conditional cash transfer programs improve infant health: Amarante et al (2011), Barber and Gertler (2008).

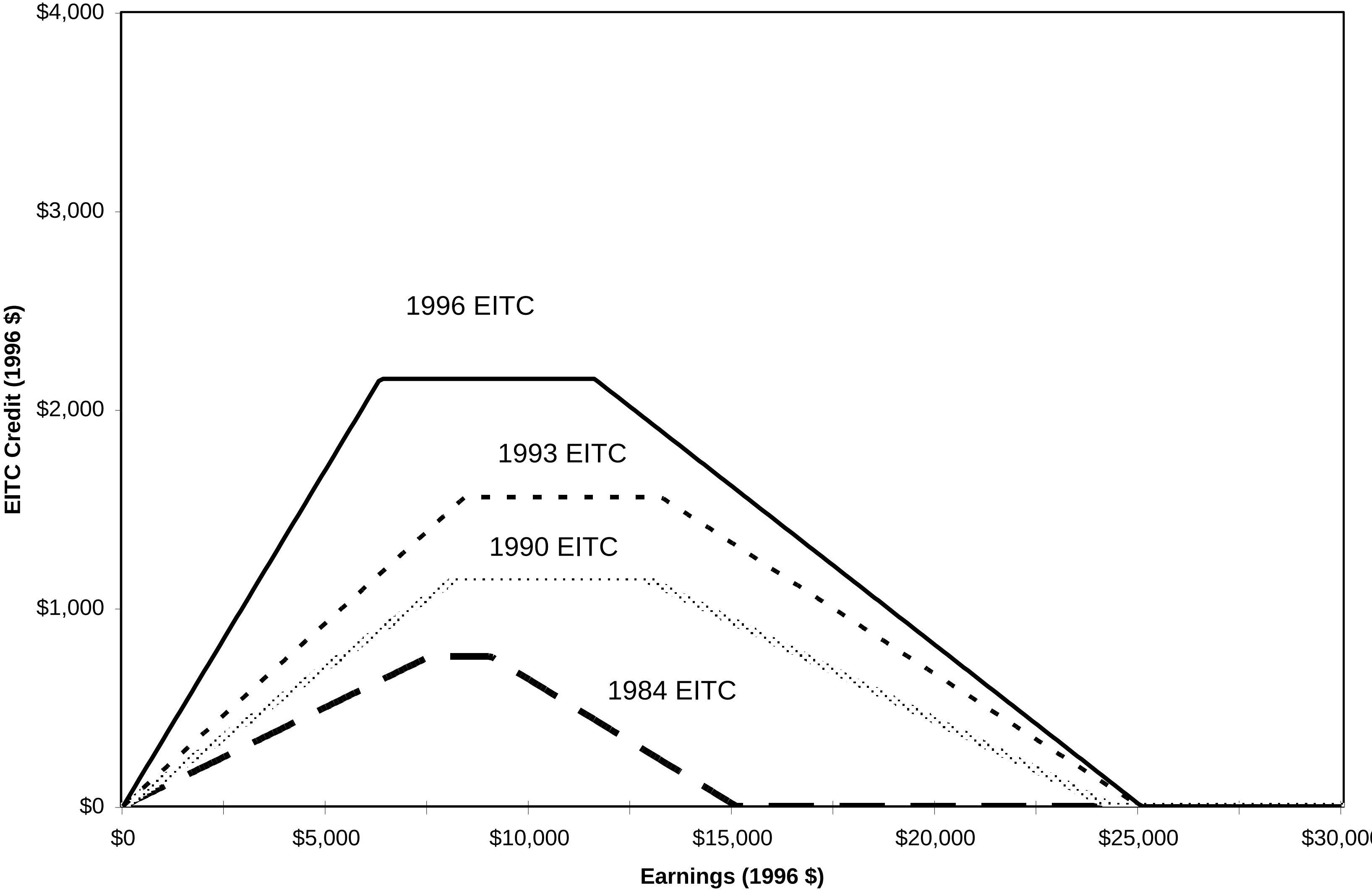
- Infant health decreases in recessions due in part to selection of mothers (Dehejia and Lleras-Muney 2004) and rises with layoffs (Lindo 2011).

I. Features of EITC (→ research design)

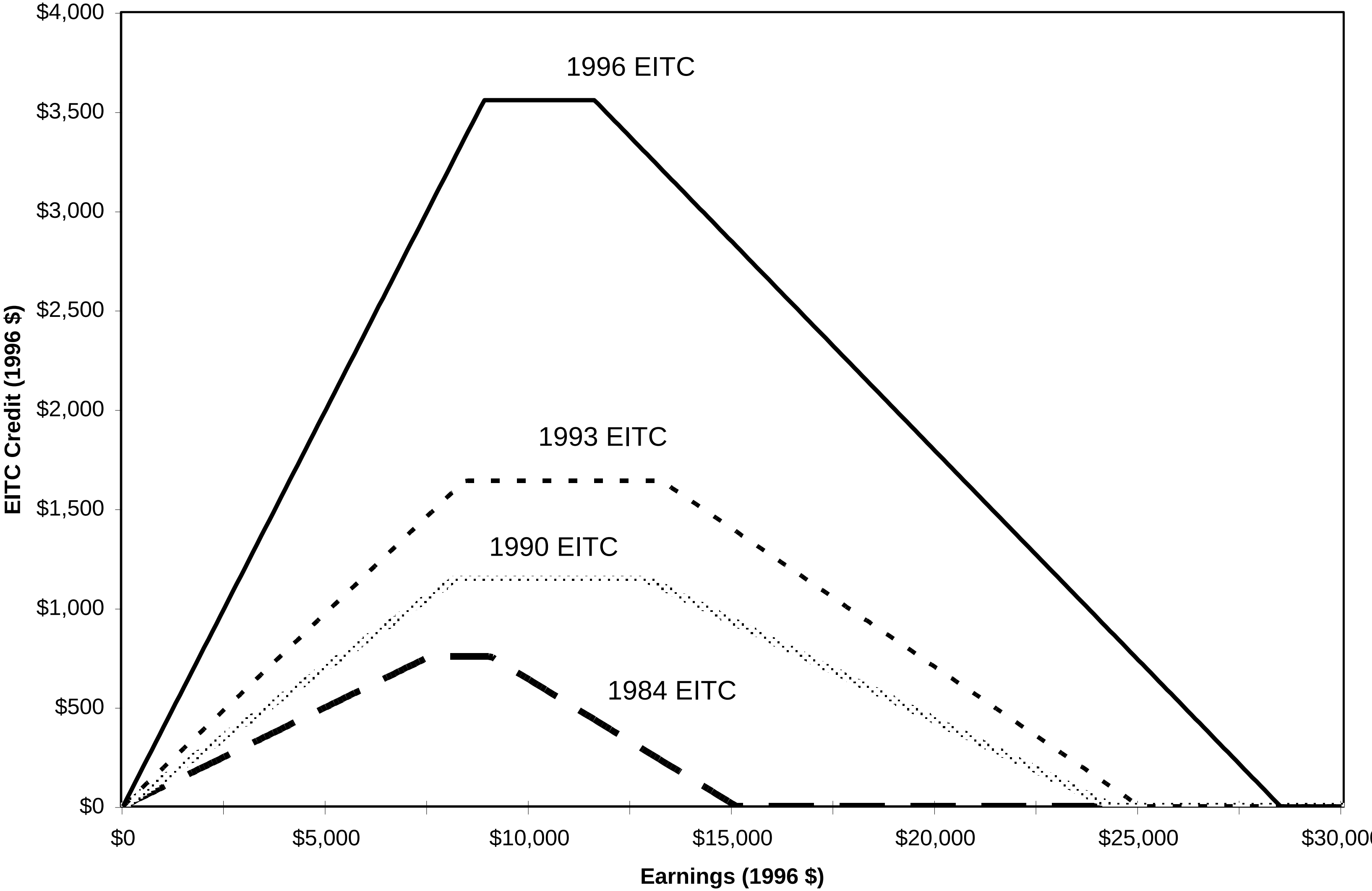
- EITC has expanded through tax reforms of 1986, 1990 and 1993.
- The increase in generosity has varied by number children.


EITC Maximum Benefits by Number of Children (1999$)
No Children
1 Child
2 or more children
TRA 1986
OBRA 1990
OBRA 1993
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
1983
1985
1987
1989
1991
1993
1995
1997
1999
Tax Year

Illustrating EITC expansions
Benefit for Families with One Child
(1996 dollars)



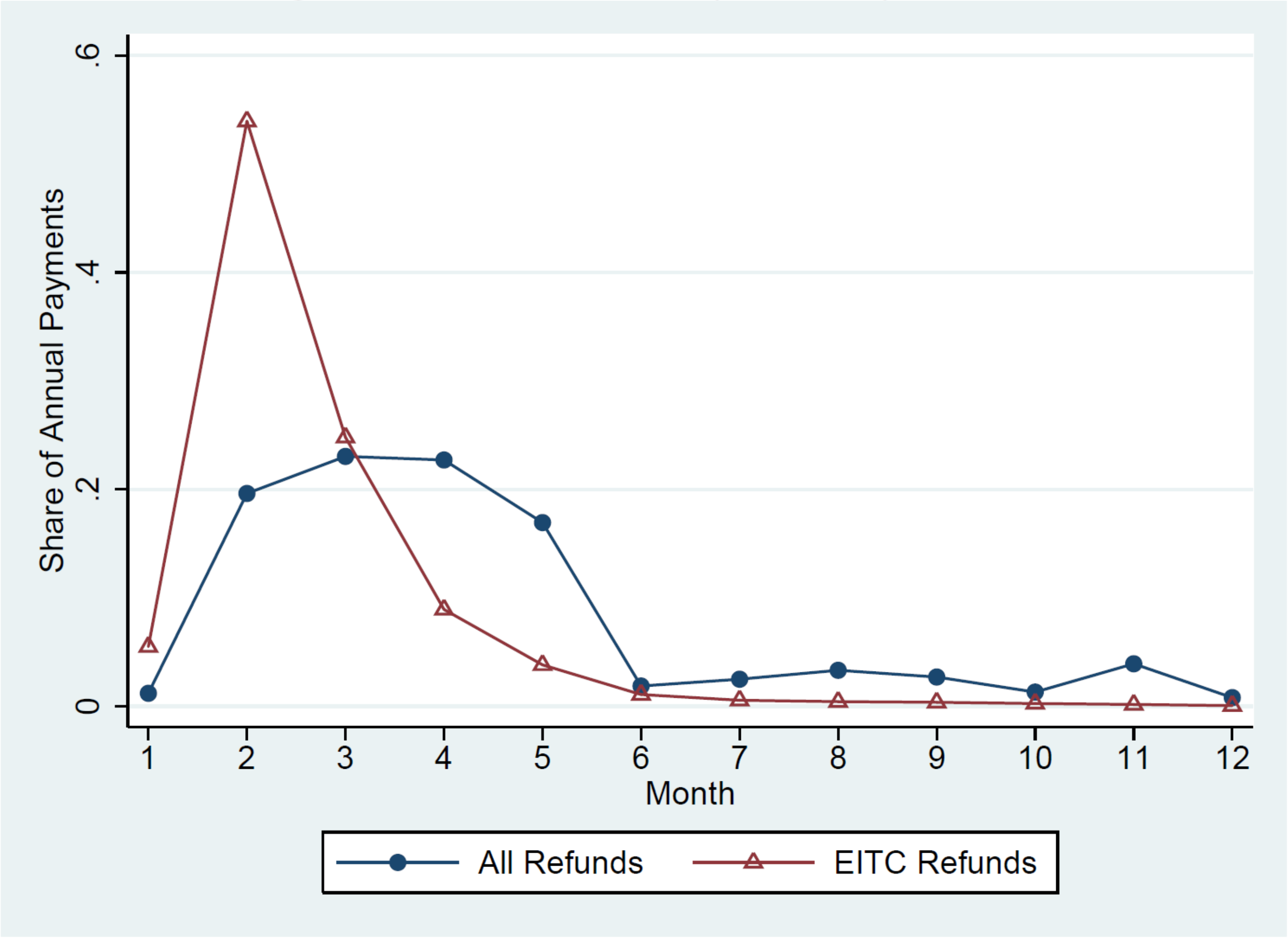
Illustrating EITC expansions Benefit for Families with Two or more Children (1996 dollars)



II. Features of EITC (→research design)

- Most EITC recipients receive refunds.
- The vast majority of these refunds are received in the first quarter of the year (tax year t refund received in first quarter of tax year t+1)

Figure 2: Tax Refund Payments by Month



Source: LaLumia (2011). 10 years averages using *Monthly Treasury Statements* 1998-2007.

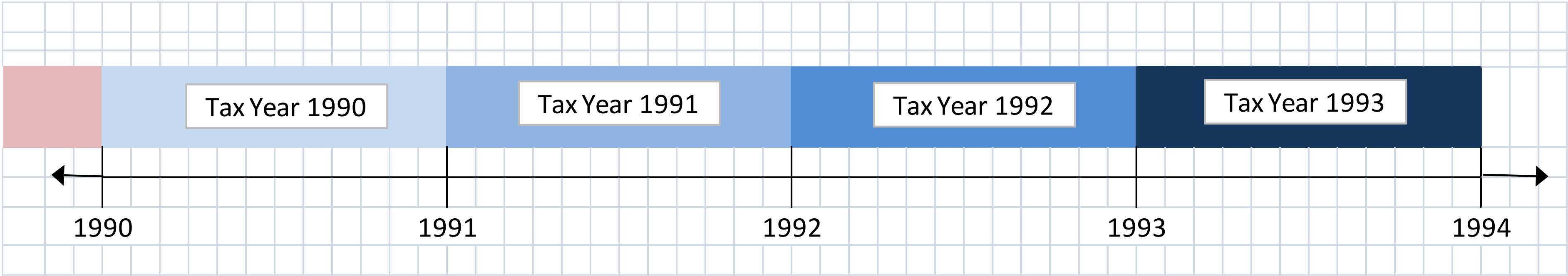
Data

- Vital Statistics Natality data: 1984 – 1999.
  - Contains information on birth outcomes, parity (live birth order), gender, mother's education, race, ethnicity, age, marital status, and state and month of birth
  - We limit sample to mothers 18+
  - Collapse to cells: "effective tax year" x state x parity x demographic group (race x ethnicity x age x ed x marstat)
  - For each cell calculate average birth weight, fraction low birth weight (2500 gms), number of births, prenatal care, smoking and drinking during pregnancy
- March CPS 1983-1999
  - Used in conjunction with TAXSIM to impute EITC benefits for different treatment groups.

Treatment: Assigning Tax Schedule

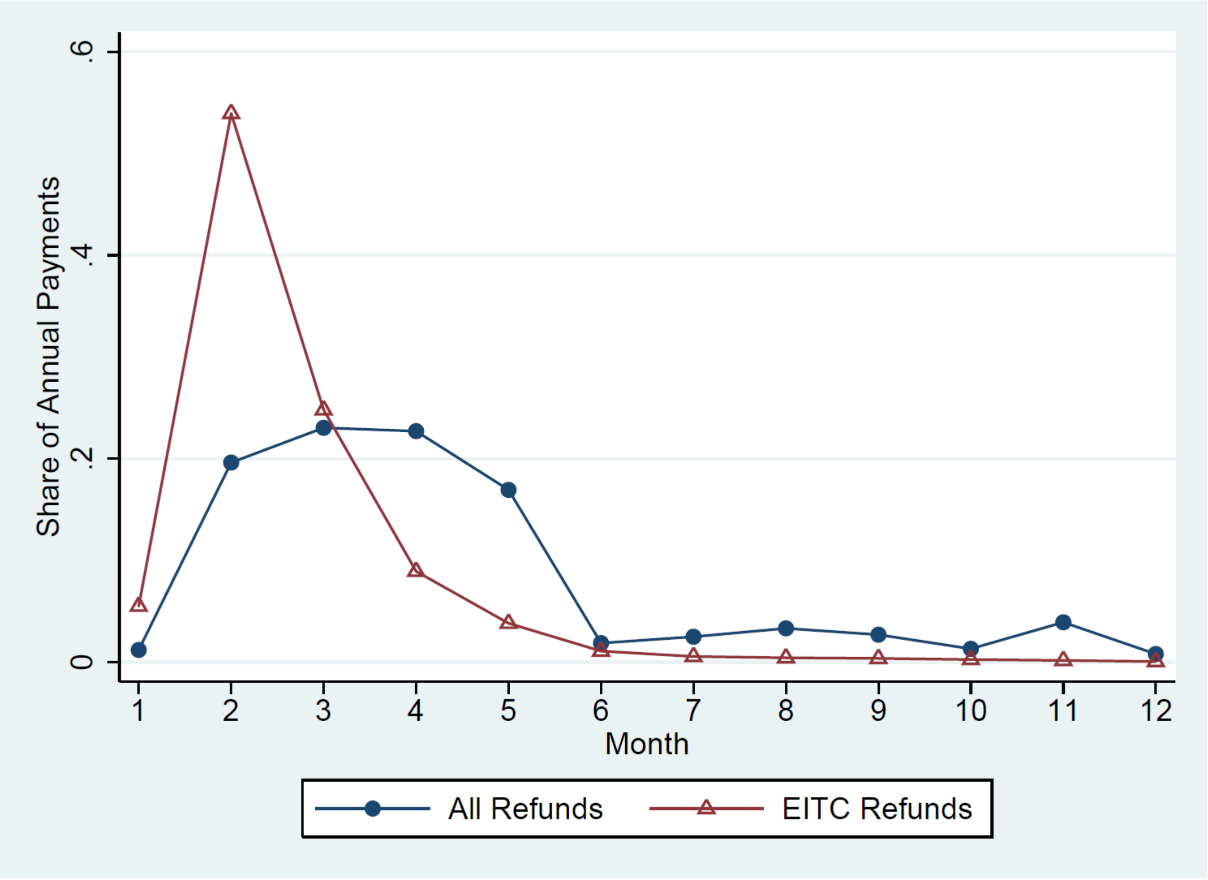
- EITC schedule varies by tax year and number of children
- The Natality data provide information on parity (1st birth, 2nd birth, etc)
  - We assume EITC treatment for birth of parity *p* is based on schedule for number of children *p-1*
- We employ three assumptions to assign timing:
  - "Cash in hand" assumption: EITC available after <u>refund</u> received
  - 12 month spending period for refund
  - Birth is treated if exposed to EITC by the beginning of the third trimester

Assigning timing: Consider births in years 1990 - 1993



Recall earlier result: Most refunds received in February

Figure 2: Tax Refund Payments by Month



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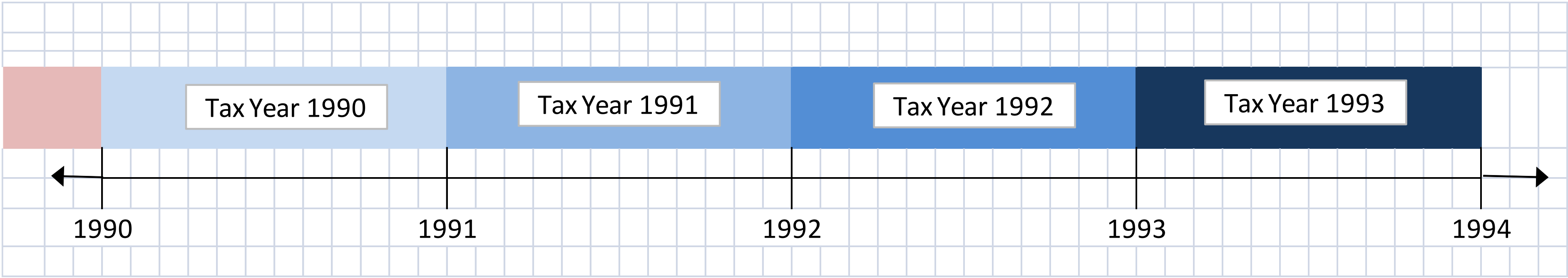
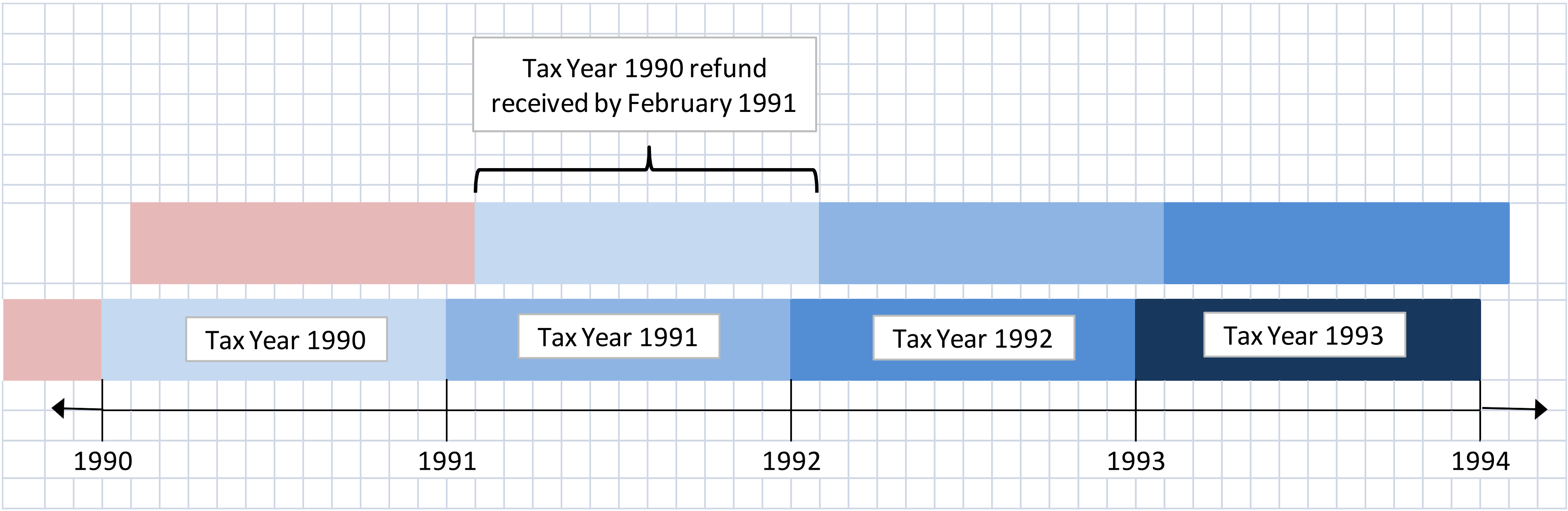
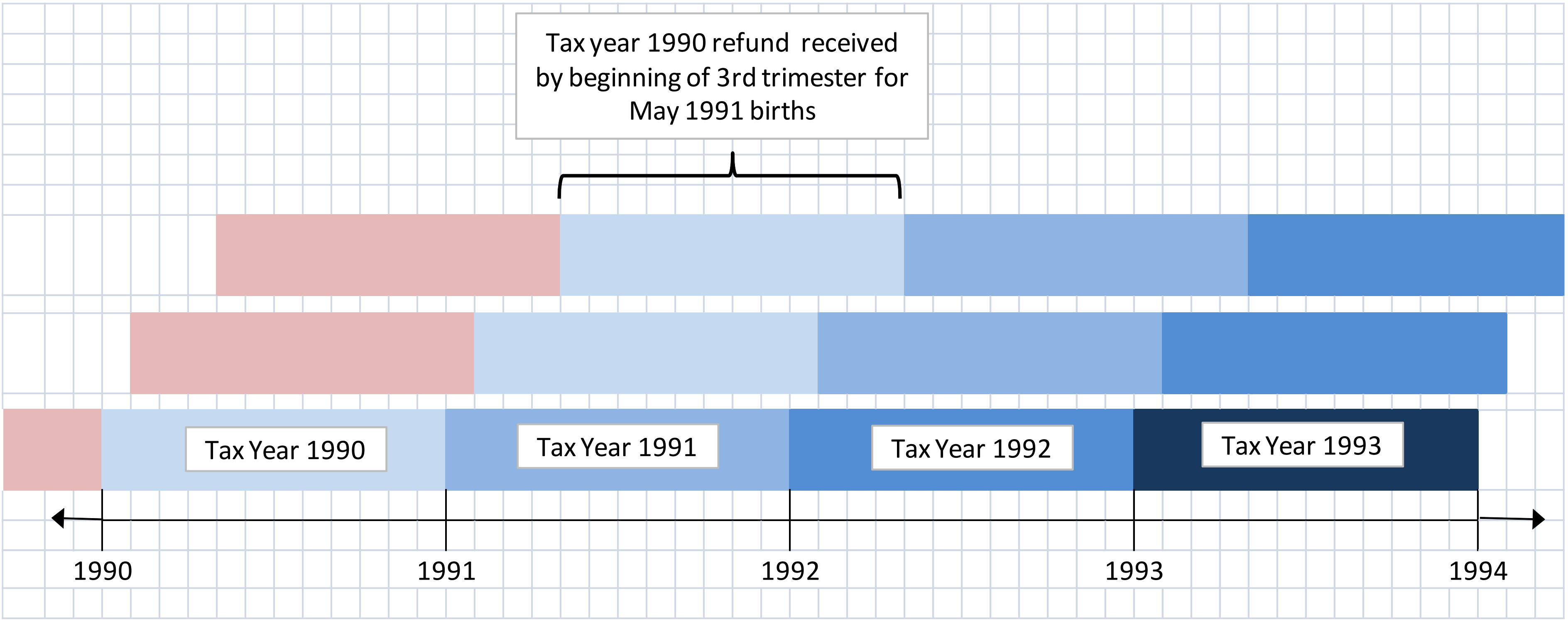
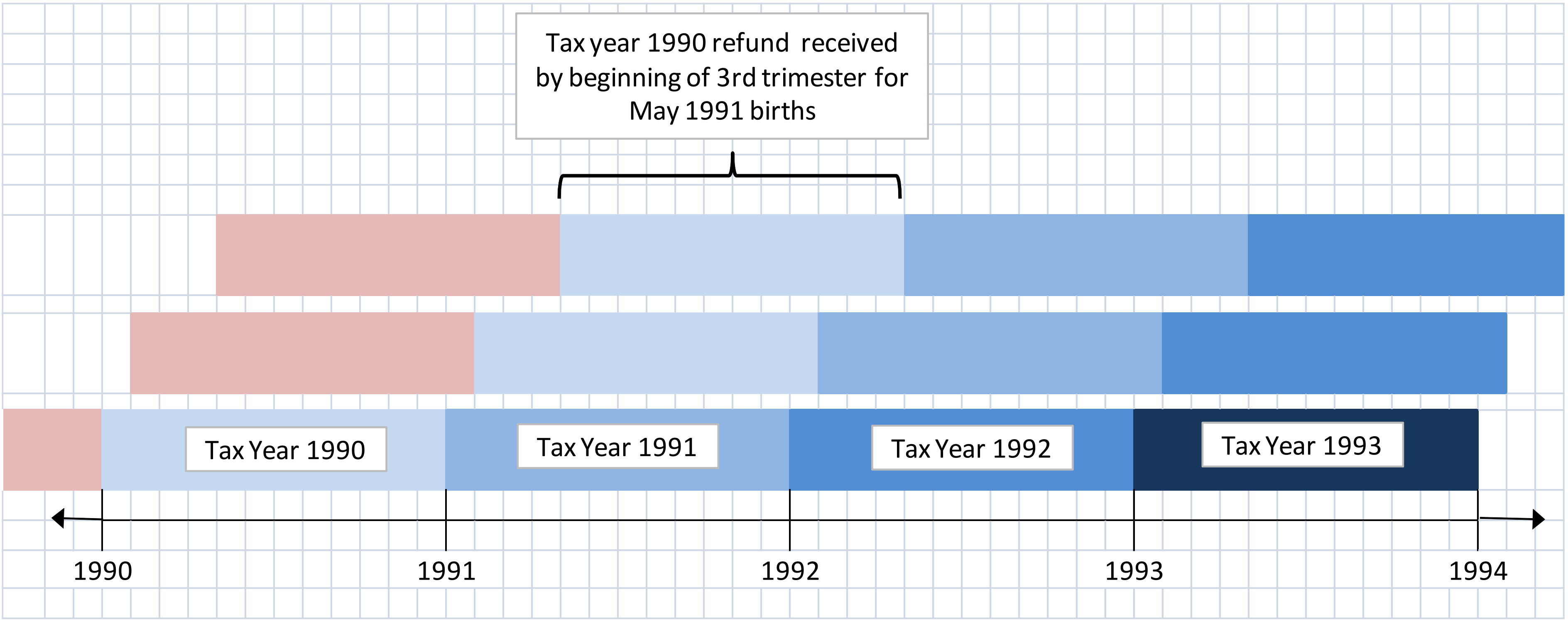

Tax Year 1990
Tax Year 1991
Tax Year 1992
Tax Year 1993
1990
1991
1992
1993
1994

Implement assumption 1 (“Cash in hand”): Refund for tax year t received by February t+1



Implement assumption 2: Birth treated if EITC received by beginning of 3rd trimester





<u>Implementation:</u>

If birth month = Jan – April → tax year = birth year – 2

If birth month = May – December → tax year = birth year – 1

Robustness checks

- Use reported gestation to identify the beginning of the third trimester
  - Rather than assuming a 9-month gestation.
  - Results are very similar.

- Alternative models of timing of impact
  - Varying “sensitive development periods”.
  - Money spent in Feb.
  - Labor supply channel.

  - Results are similar (results at end)

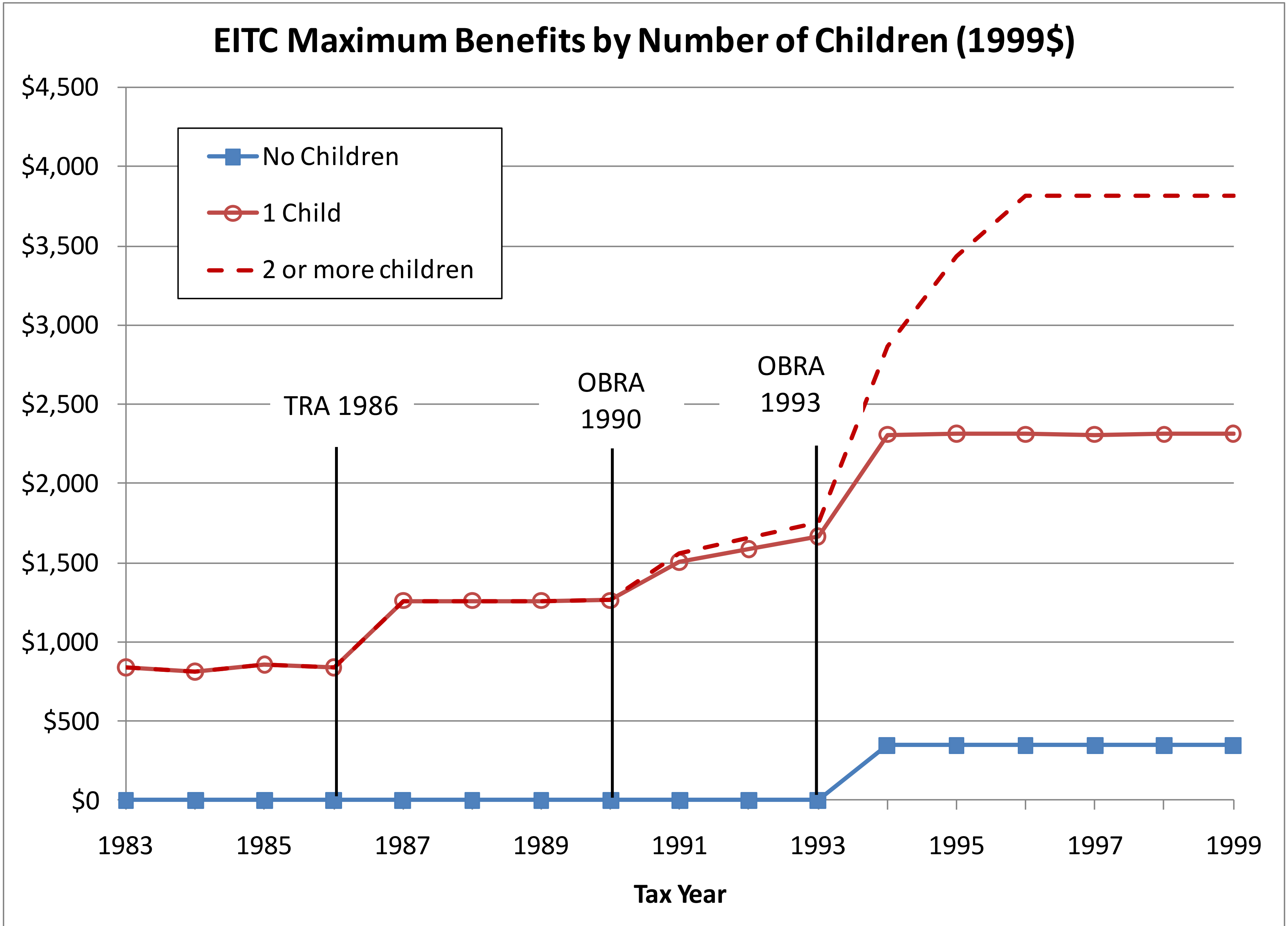
Identification Strategies:

1. Diff-Diff applied to OBRA93 expansion.
   – Compare before vs. after, 2^{nd} and higher order births to 1^{st} births (who only qualify for very small credit).
   – Take advantage of differential expansion for 1 vs 2+ children
2. Event study analysis of OBRA93
3. Panel FE estimates using multiple EITC expansions(maximum credit by parity-year)

First Estimation Strategy: OBRA 93

- Use before vs. after the 1993 expansion (pre period 1991 –1993, post period 1994 –1998).
- Three different models:
  - Second and higher births vs. first births.
  - Second births vs. first births, third and higher births vs. first births
  - Third and higher births vs. second births

$$Y_{pjst} = \alpha + \delta After_t * Parity2plus_p + \beta X_{st} + \gamma_p + \eta_s + \delta_t + \phi_j + \varepsilon_{st}$$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$2,000
$1,500
$1,000
$500
$0
1983
1985
1987
1989
1991
1993
1995
1997
1999
Tax Year

High impact sample

- Our main results are for *single women with a high school education or less*
- This sample is commonly used in the EITC literature
- We focus on *percent low birth weight* as our main outcome

OBRA93 Diff-Diff Models, Percent LBW
Single Women Ed<=12

Model:	Parity 2+ vs. 1	Parity 2, 3+ vs. 1	Parity 3+ vs. 2
Parity2+ * After	-0.354***		
	(0.074)		
Parity=2 * After		-0.164**	
		(0.072)	
Parity3+ * After		-0.528***	-0.340***
		(0.090)	(0.068)
State x year control variables	X	X	X
Mean of the dep. variable	10.2	10.2	10.7
N	47,687	47,687	35,467

Model also includes fixed effects for tax year, state, parity, and demographic cells (race, ethnicity, marital status, age, education)

Standard error clustered on state

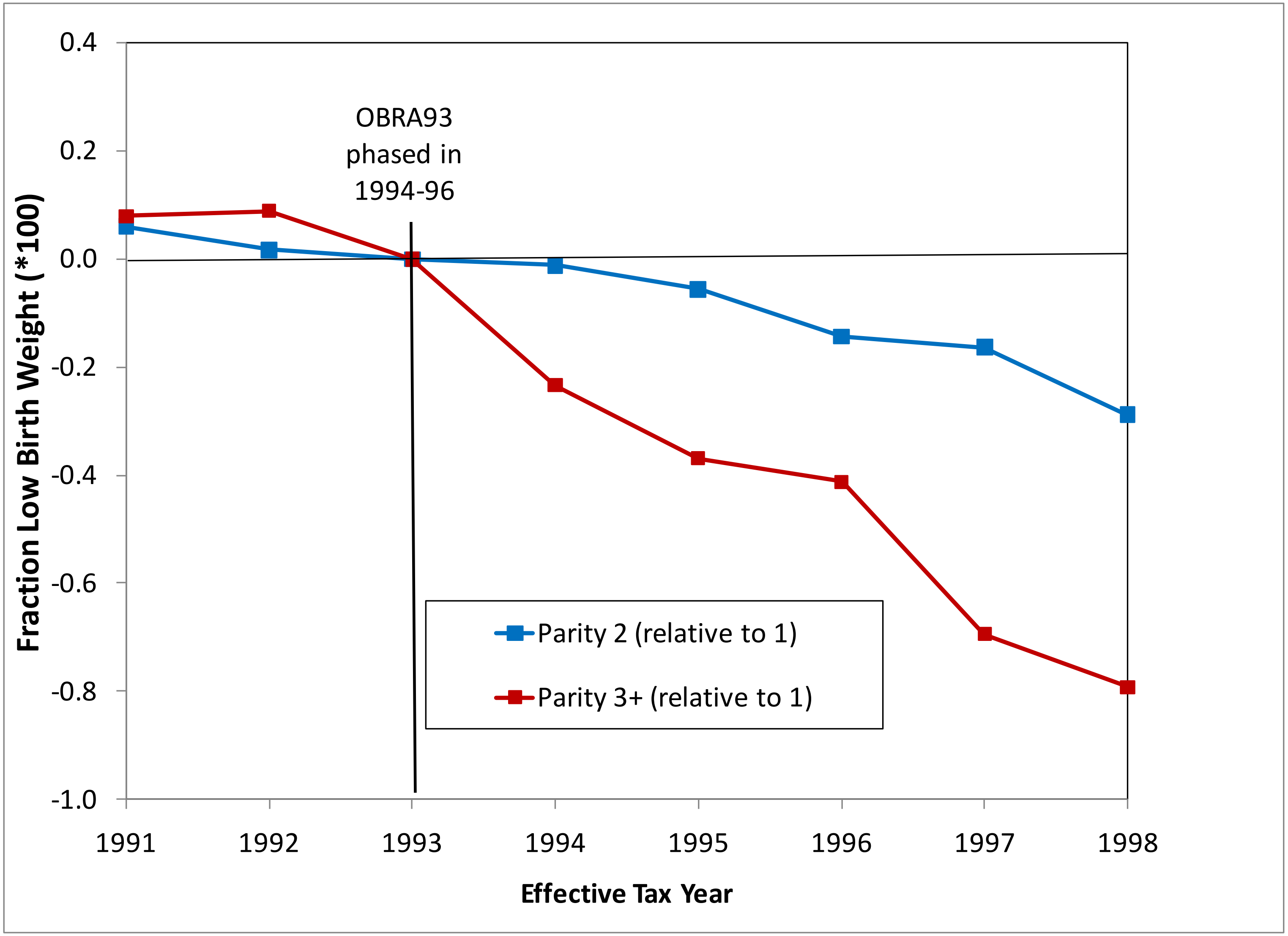
Estimates weighted by number of births in cells

Event time analysis

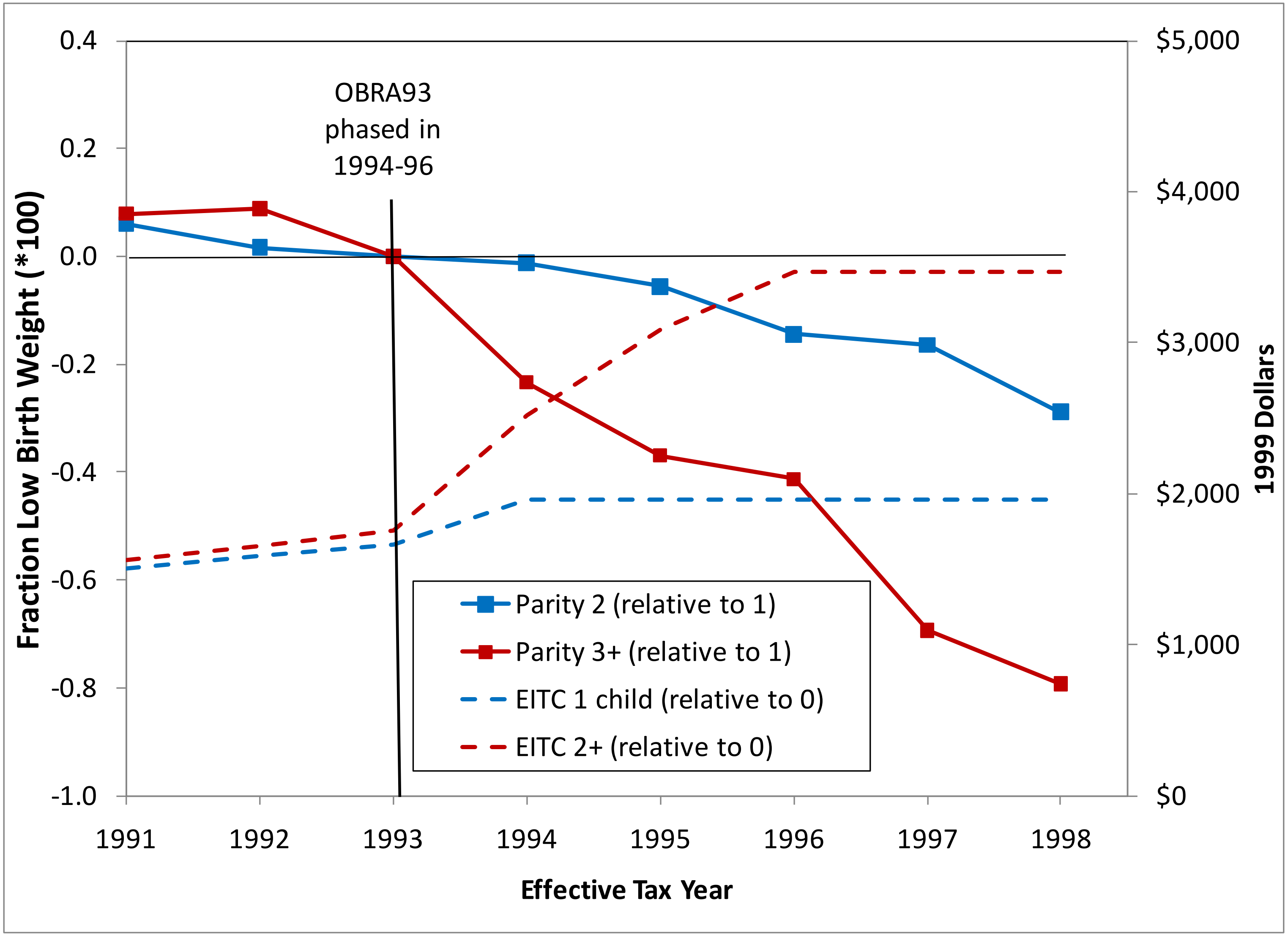
- Replace pre/post analysis with year by year comparison of the treated vs. control group
  - Replace *After* and *Parity* dummies with full set of year dummies and year dummies interacted with *Parity*

- Advantages:
  - Estimate pre-trends; test for validity of the design
  - Examine over-time pattern of treatment effect

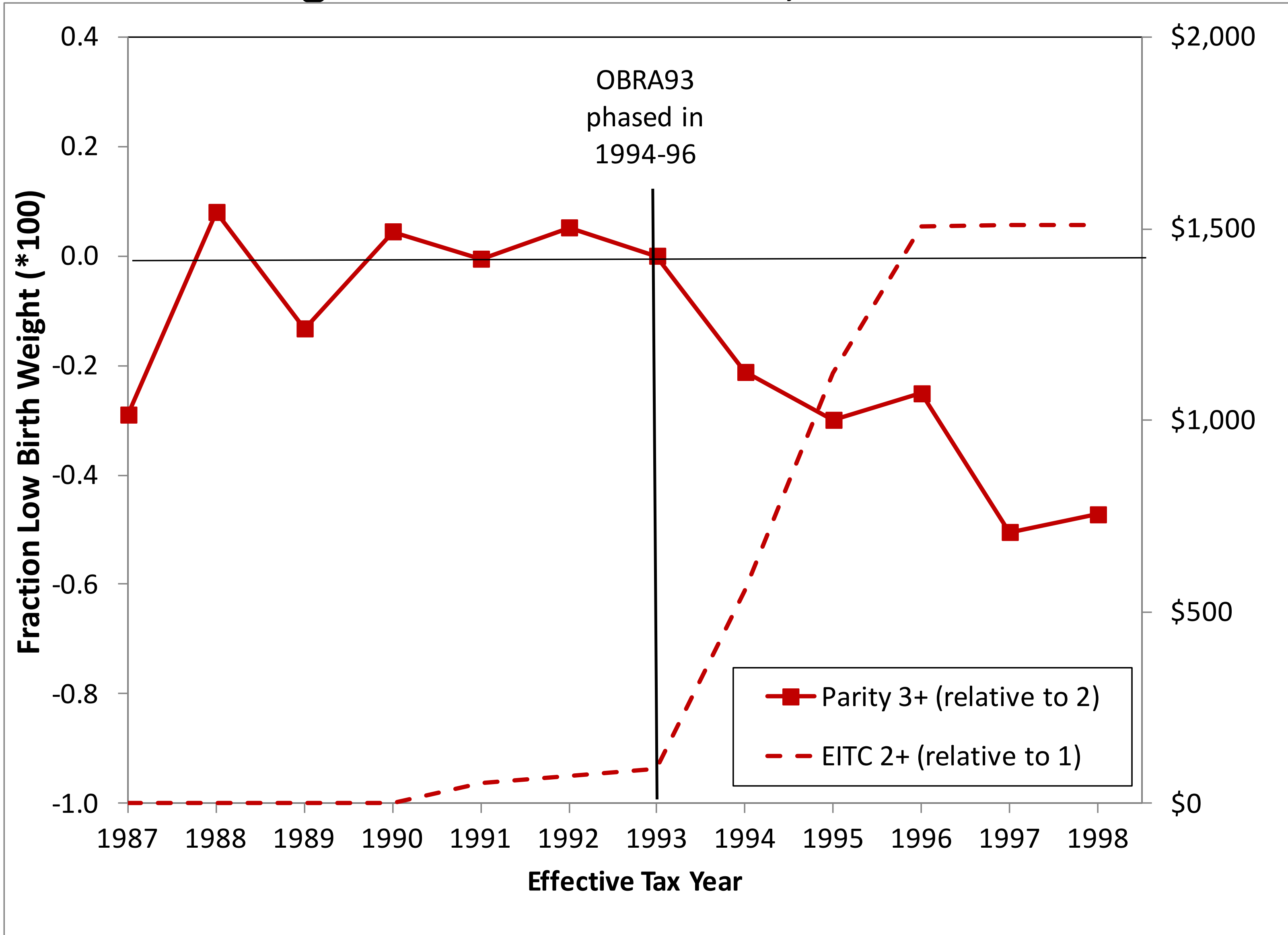
Event Study OBRA93, Percent LBW
Single Women Ed<=12



Event Study OBRA93 DD2 model, Percent LBW
Single Women Ed<=12



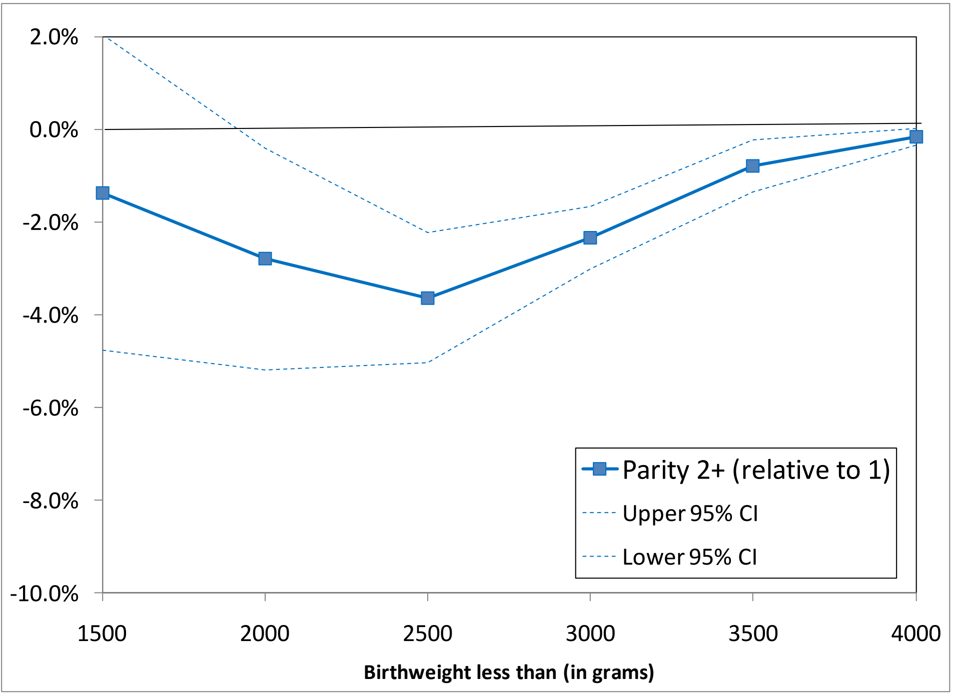
Parity 3+ vs 2
Single Women Ed<=12 , 1987-1998

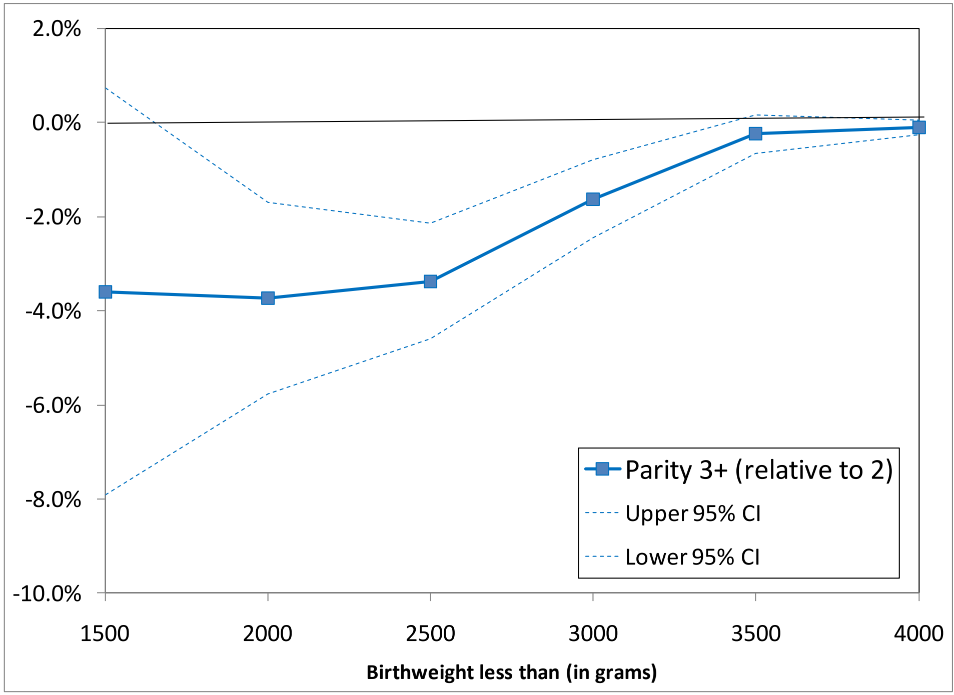


Exploring impacts across the birth weight distribution

- Low birth weight (2,500 grams) is a commonly used outcome.
- To examine impacts across the distribution, we estimate the same models for different thresholds
- Because of large differences in means across these outcome variables, we normalize the DD coefficient by the baseline mean

Parity 3+ vs 2
Single Women Ed<=12





2+ vs. 1

3+ vs. 2

Methodological check-in #1

Distribution of BW

Event Study

2+ vs. 1
3+ vs. 2

$$\boxed{LowBW} = \boxed{\beta} \cdot \boxed{Post} \cdot \boxed{HighParity} + \cdots$$

NEXT…

Subgroup analysis:
Demographic groups

"IV" for interpretation of magnitude
Context re: prior studies

OBRA93 models, Percent LBW, Single Women Ed<=12

	White	Black	Non-Hispanic	Hispanic
Model: Parity 2+ vs. 1				
Parity2+ * After	-0.132*	-0.728***	-0.413***	-0.130*
	(0.072)	(0.143)	(0.099)	(0.070)
Model: Parity 3+ vs. 2				
Parity3+ * After	-0.0231	-0.715***	-0.407***	-0.121
	(0.071)	(0.121)	(0.094)	(0.092)
Mean of the dep. variable	8.23	14.92	12.12	6.78
N	16,247	10,273	19,611	10,951

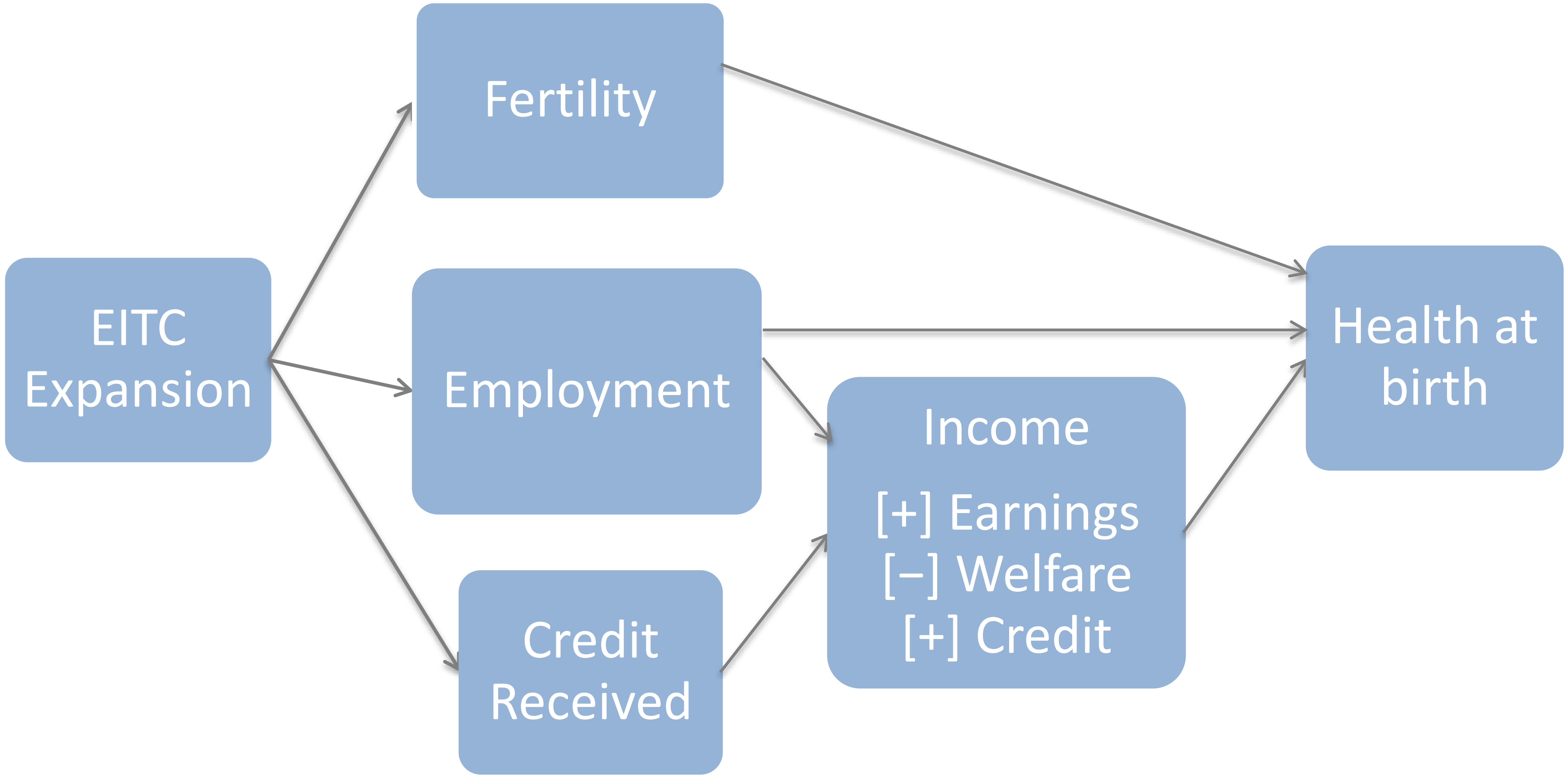
Larger effects for blacks and non-Hispanics

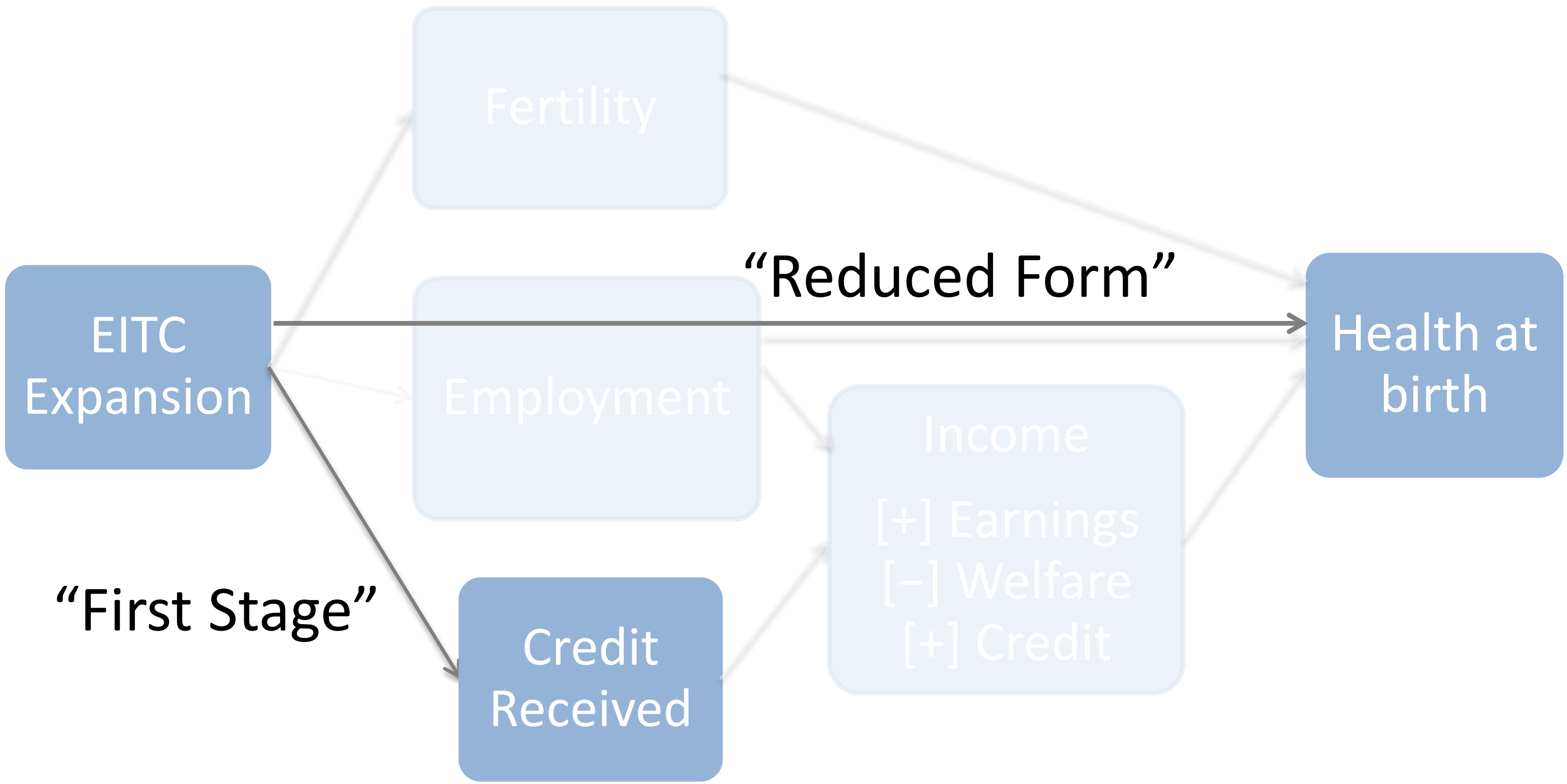
- undocumented Hispanic mothers?

- less knowledge, lower take-up for Hispanic mothers?

Magnitudes: Interpreting the Reduced Form

- We use the 1993-1999 March CPS combined with TAXSIM to impute the magnitude of the OBRA93 EITC "treatment"
  - Sample of women 18-45 with children<3 (proxy for "new births sample")
  - Use observed marital status and number of children to assign tax schedule for effective tax year
  - Impute EITC using TAXSIM (using CPS earnings/income)
- Estimate difference-in-difference impact on EITC income (e.g. by parity and pre/post) → OBRA93 EITC treatment
- Assume effects operate through EITC $ amount
  - (no behavioral response)


Fertility
EITC Expansion
Employment
Health at birth
Income
[+] Earnings
[−] Welfare
[+] Credit
Credit Received



EITC Expansion
Fertility
Employment
Income
[+] Earnings
[–] Welfare
[+] Credit
Credit Received
Health at birth
“Reduced Form”
“First Stage”

Magnitudes OBRA93, Percent LBW
Single Women Ed<=12

	All
	A. PARITY 2+ vs. PARITY 1
Treatment Effect	-0.354
EITC increase (2009$)	$521
Treatment on Treated per $1000 (2009$)	-0.68
ToTper $1000 (2009$), % impact	-6.69%

ToT per $1000 = 7%

Comparison to other studies (ToT per $1000 in 2009$):

- Food stamps: 4% for whites, 2% for blacks *[Almond et al 2011]*
- WIC: 10-20% *[Hoynes et al 2011, and others]*
- Layoffs: 4.7% *[Lindo 2011]*

Magnitudes OBRA93, Percent LBW
Single Women Ed<=12

	All	White	Black
A. PARITY 2+ vs. PARITY 1			
Treatment Effect	-0.354	-0.132	-0.728
EITC increase (2009$)	$521	$471	$624
Treatment on Treated per $1000 (2009$)	-0.68	-0.28	-1.17
ToTper $1000 (2009$), % impact	-6.69%	-3.44%	-8.09%

Magnitudes OBRA93, Percent LBW
Single Women Ed<=12

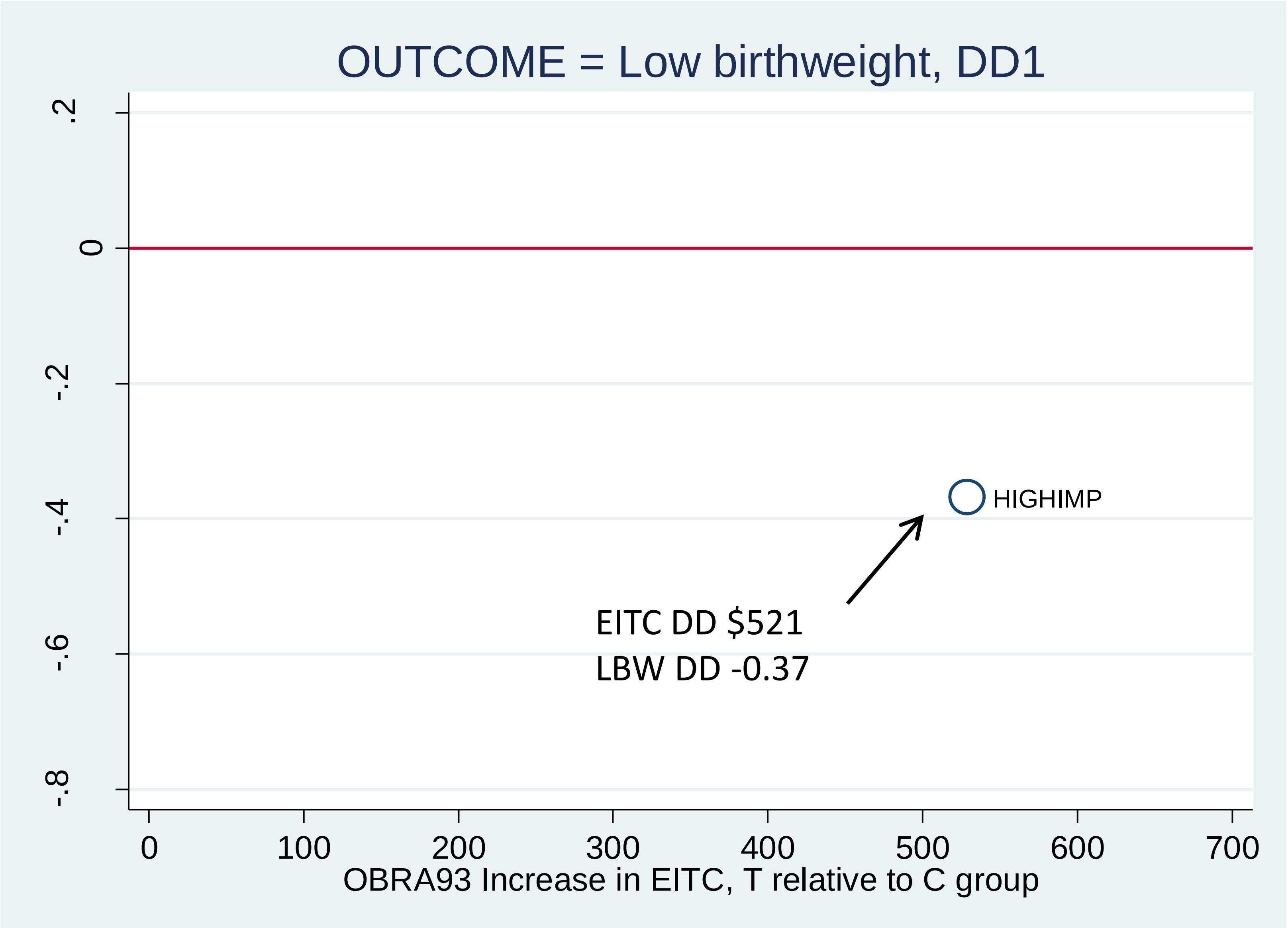
	All	White	Black
A. PARITY 2+ vs. PARITY 1			
Treatment Effect	-0.354	-0.132	-0.728
EITC increase (2009$)	$521	$471	$624
Treatment on Treated per $1000 (2009$)	-0.68	-0.28	-1.17
ToTper $1000 (2009$), % impact	-6.69%	-3.44%	-8.09%
B. PARITY=2, PARITY 3+ vs PARITY 1			
Treatment Effect (2 vs. 1)	-0.164		
EITC Increase (2009$) (2 vs 1)	$373		
Treatment on Treated per $1000 (2009$)	-0.44		
ToTper $1000 (2009$), % impact	-4.33%		
Treatment Effect (3+ vs. 1)	-0.528		
EITC Increase (2009$) (3+ vs 1)	$667		
Treatment on Treated per $1000 (2009$)	-0.79		
ToTper $1000 (2009$), % impact	-7.79%		
Mean of the dependent variable	10.2		

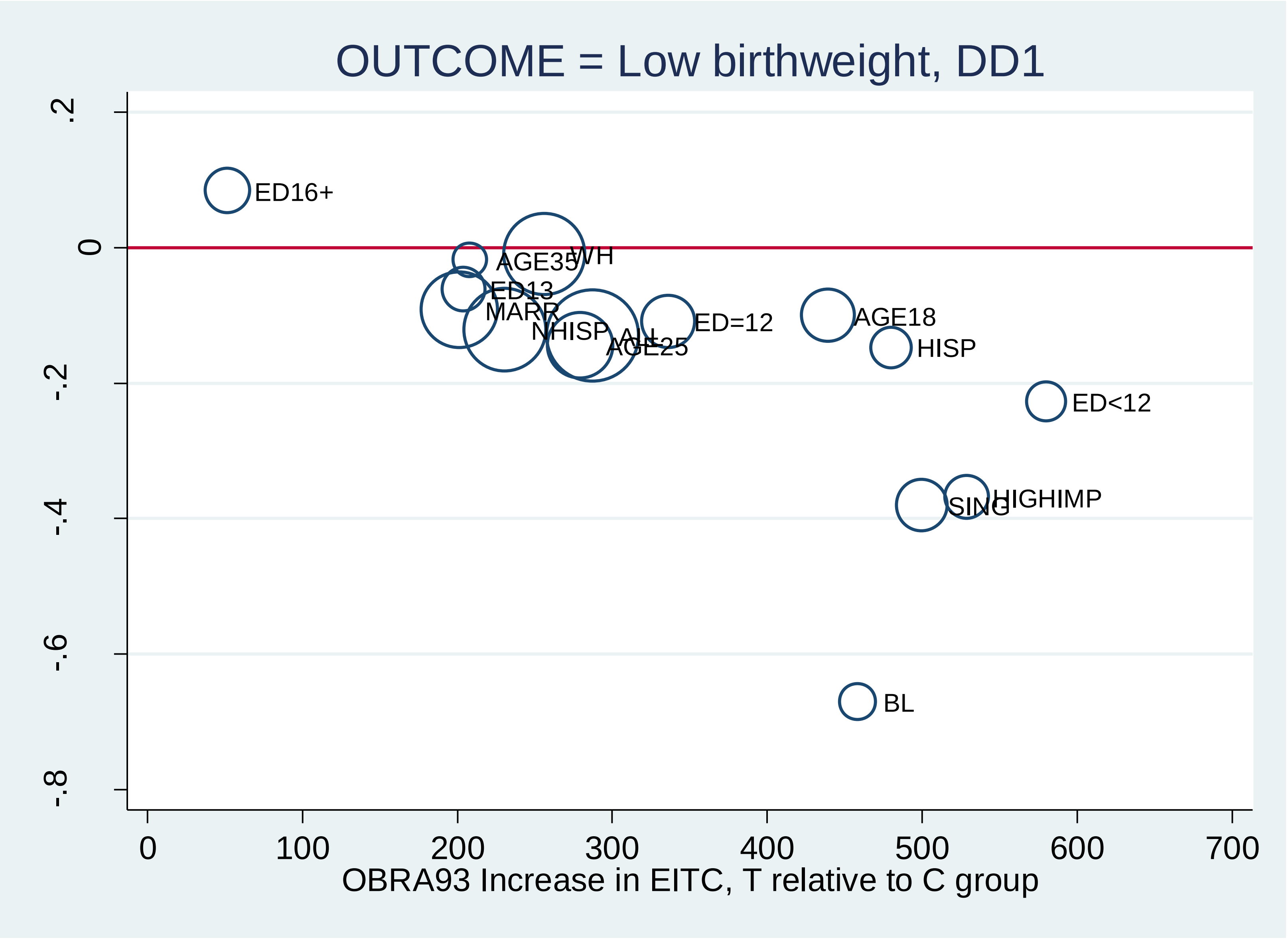
"First stage" bigger for 3+ than 2…

TOT is also bigger

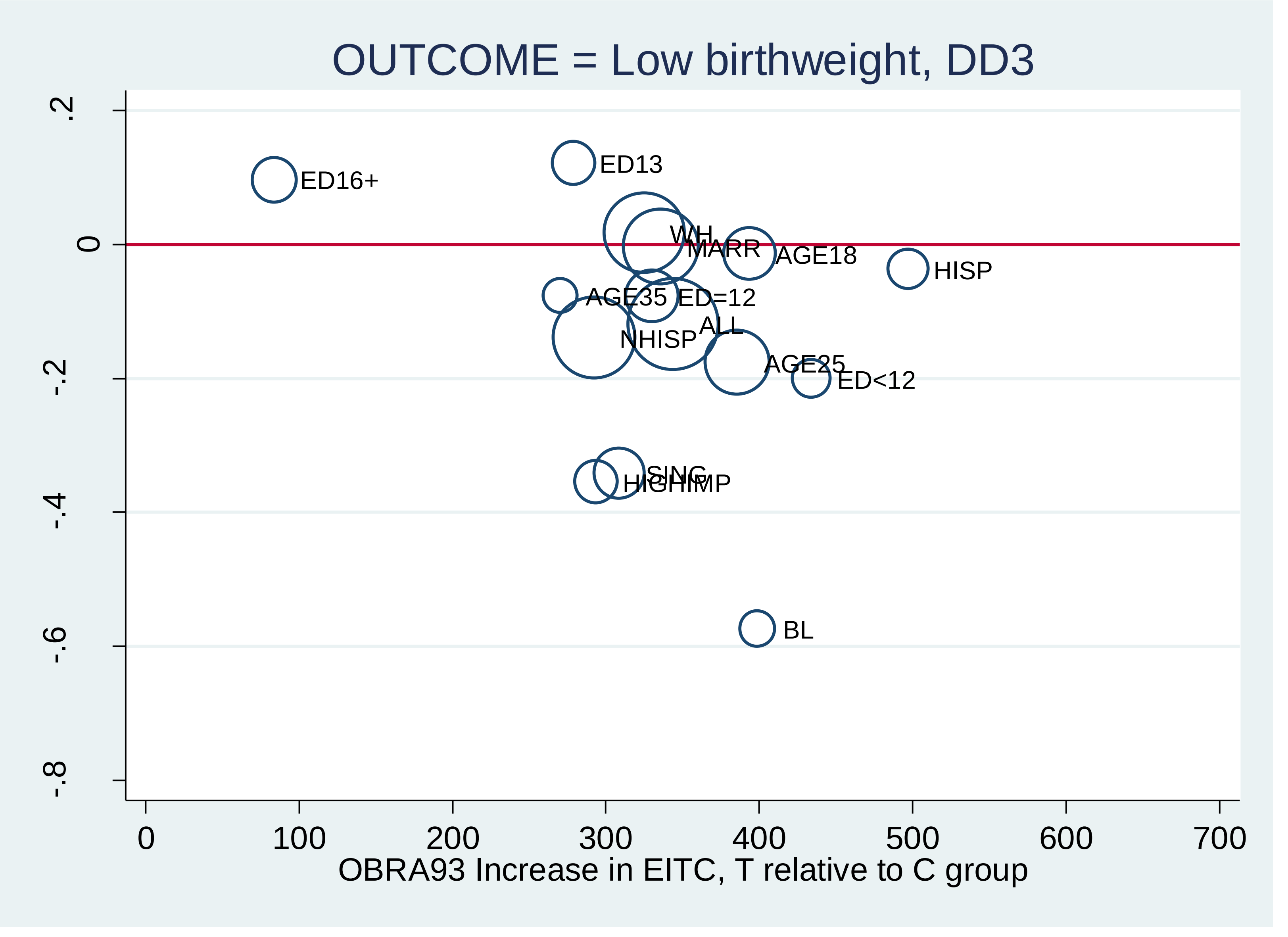
Subgroup Analysis

- The likelihood of being impacted the EITC varies across groups.
- We use the full sample and estimate the same models on subgroups: race (white, black), ethnicity (Hispanic), Non-Hispanic), age (18-24, 25-34, 35+), education (<12,=12,13-15,16+), marital status (married, single), and (for continuity) the high impact sample.
- We use the CPS and TAXSIM to calculate the DD impact on EITC income as above.


OUTCOME = Low birthweight, DD1
.2
0
-.2
-.4
-.6
-.8
0
100
200
300
400
500
600
700
OBRA93 Increase in EITC, T relative to C group
HIGHIMP
EITC DD $521
LBW DD -0.37



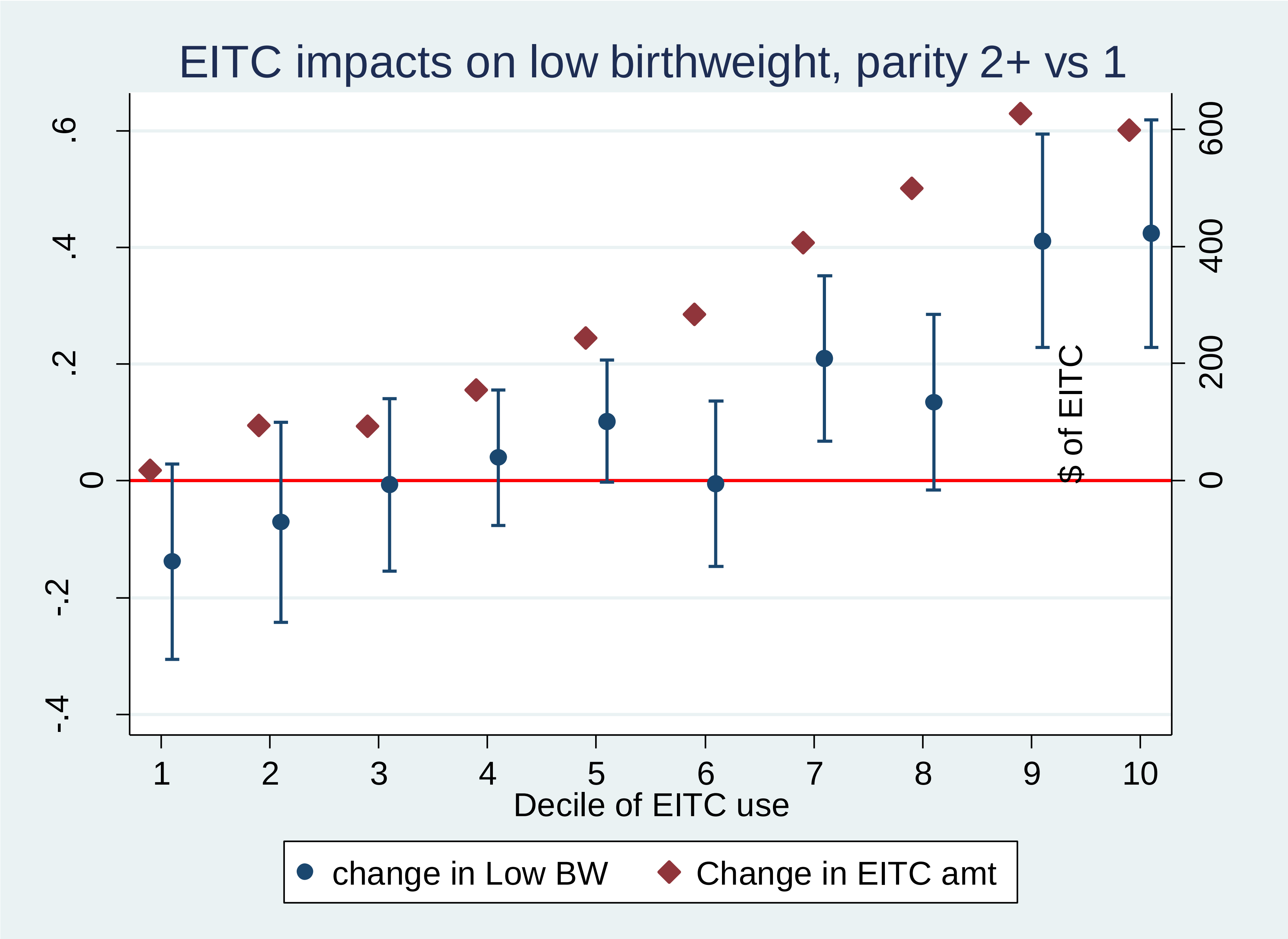
OUTCOME = Low birthweight, DD1
.2
0
-.2
-.4
-.6
-.8
ED16+
AGE35
WH
ED13
MARR
NHISP
ALL
AGE25
ED=12
AGE18
HISP
ED<12
SING
HIGHIMP
BL
0
100
200
300
400
500
600
700
OBRA93 Increase in EITC, T relative to C group



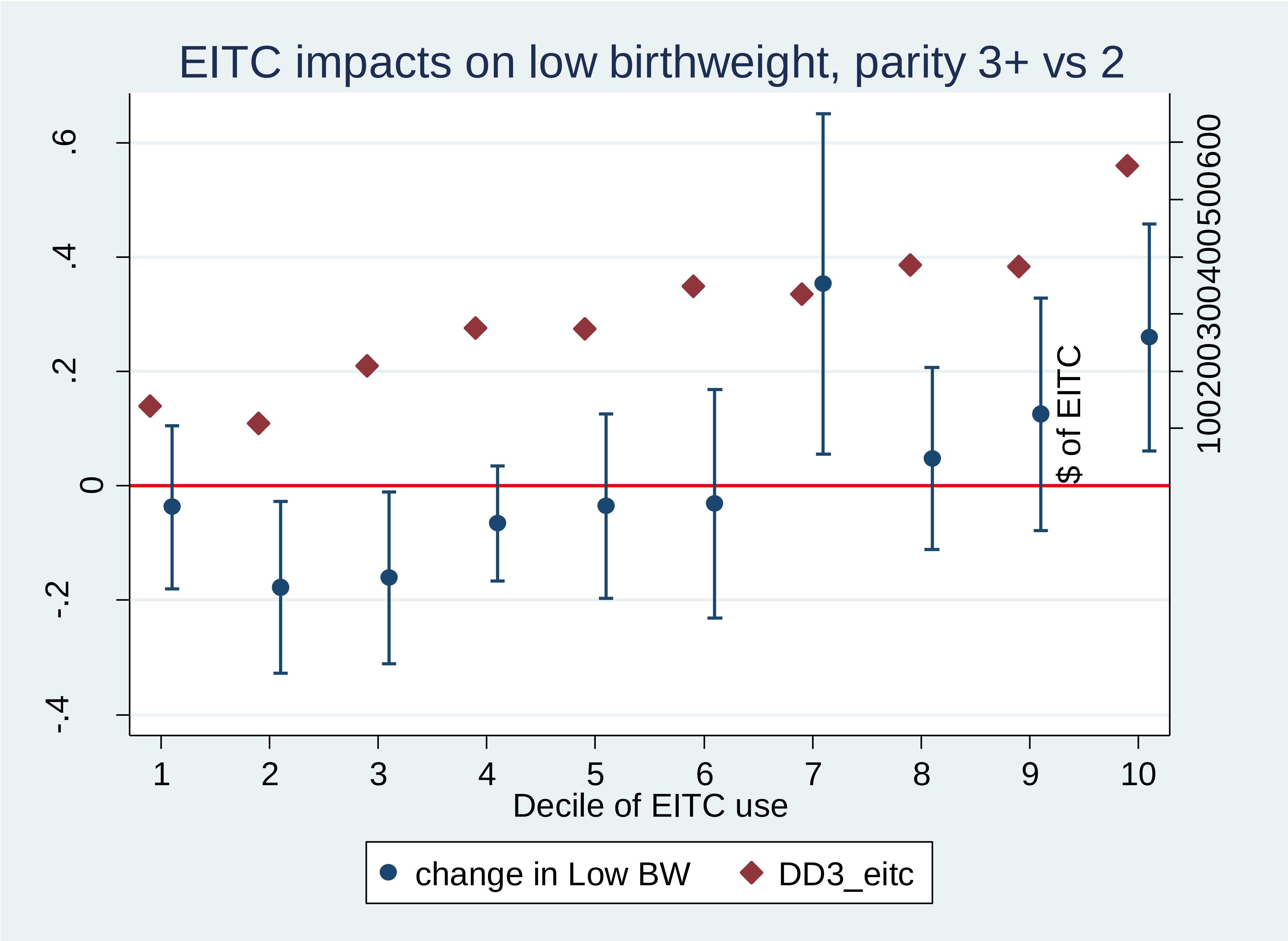
OUTCOME = Low birthweight, DD3
.2
0
-.2
-.4
-.6
-.8
0
100
200
300
400
500
600
700
OBRA93 Increase in EITC, T relative to C group
ED16+
ED13
WH
MARR
AGE18
HISP
AGE35
ED=12
ALL
NHISP
AGE25
ED<12
SING
HIGHIMP
BL

Predicted EITC Deciles

- One drawback to this subgroup analysis is that the groups are overlapping.
- As an alternative, we take the full sample and divide it into 10 deciles of predicted EITC treatment
  - March CPS 1997-2001, women 18-45 with 2 or more children (>=1 less than 6).
    - By limiting the sample in this way we have a stable tax schedule
  - Regress EITC on state FE and full set of interactions of demographics (race, education, age, marital status)
  - Predict EITC in natality sample, create deciles (fixed over time and across parity, by construction)
- Use the CPS and TAXSIM to calculate the DD impact on EITC income as above.



EITC impacts on low birthweight, parity 2+ vs 1
-.4
-.2
0
.2
.4
.6
0
200
400
600
$ of EITC
1
2
3
4
5
6
7
8
9
10
Decile of EITC use
change in Low BW
Change in EITC amt


EITC impacts on low birthweight, parity 3+ vs 2
-.4
-.2
0
.2
.4
.6
1
2
3
4
5
6
7
8
9
10
Decile of EITC use
$ of EITC
100
200
300
400
500
600
change in Low BW
DD3_eitc

Additional Results and Robustness

- Extend time frame: Use variation from multiple tax reforms in 86, 90, 93 and find very similar results.
  - Changes RHS var. to continuous (EITC "maximum credit")
  - Robust to parity * time trends
- Other outcomes: Average birthweight, pre-term, weight-for-age, and APGAR also show significant improvements.
- Robustness: The results are robust to dropping Mexican born, higher order parities (4+), using observed gestation to assign treatment, and balancing the sample on states reporting education and reporting marital status.
- Similar results by gender of birth.

Methodological check-in #2

Distribution of BW
Mean BW
Gestation, APGAR

Event Study

2+ vs. 1
3+ vs. 2

Multiple expansions
- Continuous treatment
- Parity time trends

$$LowBW = \beta \cdot \boxed{Post \cdot HighParity} + \cdots$$

Subgroup analysis:
Demographic groups
Deciles of predicted impact

"IV" for interpretation of magnitude
Context re: prior studies

<u>Robustness</u>
- Exclude subgroups
- Observed gestation

<u>Falsification Tests</u>
- Pre-trends
- "Untreated" subgroups

Evidence on possible mechanisms

- Prenatal care, any smoking during pregnancy, any drinking during pregnancy
- Here we present the results for OBRA93, in the high impact sample.

	Prenatal care began before 3rd tri	Prenatal care, number visits	Kessner Index, Inadequate care	Any Smoking	Any Drinking
<u>Model: Parity 2+ vs. 1</u>					
Parity2+ * After	0.634***	0.123***	-1.105***	-1.930***	-1.060***
	(0.175)	(0.0226)	(0.198)	(0.152)	(0.128)
N	47,246	47,110	46,957	45,554	46,128
Mean, dep. Var	91.45	10.27	12.06	25.74	2.603

Exploring a possible role of health insurance

- We know EITC -> increase in labor supply, and transitions from welfare to work
- Expect reduction in Medicaid
  - Possibly increase in private insurance
- Use March CPS 1991-1998
  - Construct treatment and control groups to match our OBRA analysis

Results for health insurance
CPS, OBRA93, High impact sample

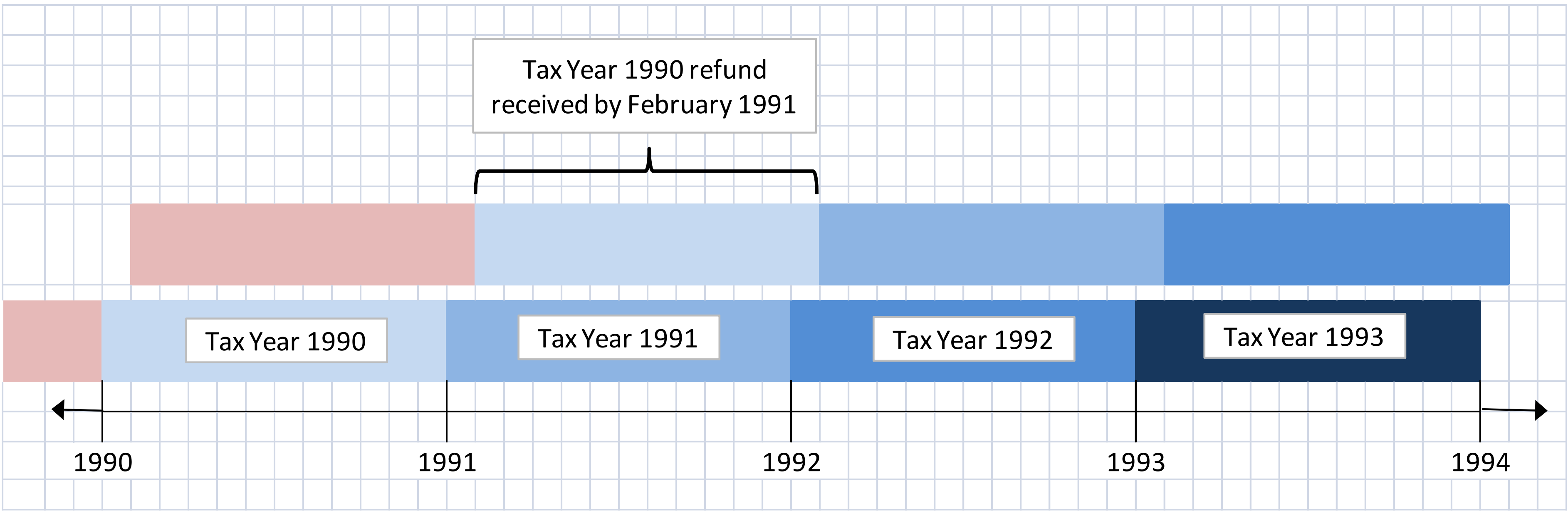
	Employed Last Year	HI Coverage: Mediaid	HI Coverage: Any Private	HI Coverage: Any
Model: any children vs. none				
anykids * after	0.077***	-0.068***	0.023***	-0.035***
	(0.008)	(0.008)	(0.009)	(0.008)
Mean Dep Var	0.70	0.29	0.38	0.71
Model: 2+ children vs. 1				
2+kids * after	0.060***	-0.037***	0.032***	-0.001
	(0.011)	(0.110)	(0.011)	(0.010)
Mean Dep Var	0.65	0.40	0.32	0.74
Model: 2+ Children vs. 1 (and presence of young child)				
2+kids * after	0.048***	-0.021	0.028**	0.009
	(0.015)	(0.016)	(0.014)	(0.014)
Mean Dep Var	0.59	0.49	0.23	0.73

Mechanisms

- Increases in prenatal care and reductions in smoking are part of the pathway for our results for improving infant health
- This could be generated by additional income (affordability of prenatal care), employment (less smoking)
- Overall health insurance, if anything, declines. But there could be an effect for some of an “upgrading” due to the increase in private insurance

Alternative Timing Models

1. Timing of sensitive period
2. When the $$ is spent
3. Labor Supply vs. cash receipt



Alternative Timing Models

- Assume different "sensitive periods" of fetal development

Model	When do I get the money?	Assign treatment based on expo		
		1st trimester	2nd trimester	3rd trimester
Assign EITC in 7th month (base case)	Refund-cash, all year			-0.307***
				(0.0659)
Assign EITC based on 3rd trimester	Refund-cash, all year			-0.304***
				(0.0671)
Assign EITC based on 2nd trimester	Refund-cash, all year		-0.314***	
			(0.0667)	
Assign EITC based on 1st trimester	Refund-cash, all year	-0.332***		
		(0.0688)		
Horse race all trimesters	Refund-cash, all year	-0.419*	-0.145	0.231
		(0.237)	(0.351)	(0.246)

Alternative Timing Models

- Assume spend all $$ in February

				3rd tri.
All cash in Feb, based on 3rd trimester	Refund-cash, Feb only			-0.458***
				(0.095)
All cash in Feb, horse race all trimesters	Refund-cash, Feb only	-0.191	-0.318***	-0.581***
		(0.129)	(0.134)	(0.136)

- Model "labor supply" channel

		3rd tri.	3rd tri., labor supply
Labor supply model, 3rd trimester	Labor supply/earnings		-0.263***
			(0.066)
Horse race rebate credit & labor supply	Refund-cash & labor supply	-0.605**	0.306**
		(0.126)	(0.132)

Threats to the design: endogenous births

- If EITC changes fertility (composition of births) then the results could be biased [most likely to 0].
  - Increase in births among disadvantaged?
  - Increase in fetal survival?
- We apply the same identification strategy and examine impacts on number and composition of births.

Small, insignificant impact on ln(births)

	Log(Births)
Model: Parity 2+ vs. 1	
Parity2+ * After	-0.020
	(0.014)
Mean of Dep Var	
N	37639
Model: Parity 3+ vs. 2	
Parity3+ * After	-0.017
	(0.016)
Mean of Dep Var	
N	25419

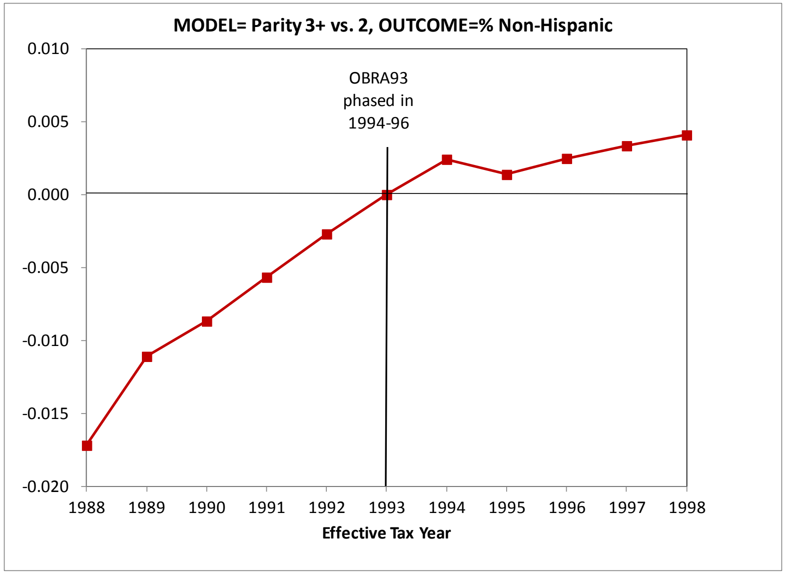
Similar finding in Baughman & Dickert-Conlin (2009).

Some significant estimates for observable characteristics of births

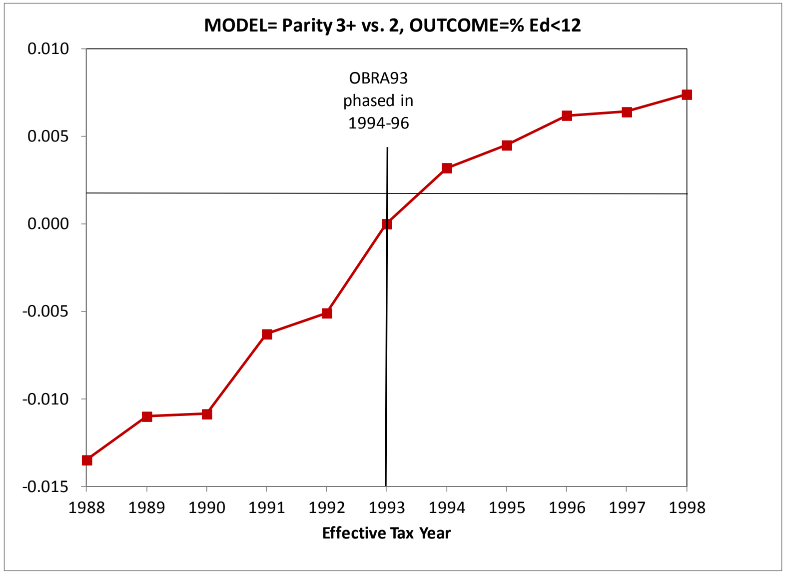
		Fraction in state-year cell:						
	Log(Births)	black	white	Non-Hispanic	18-24	24-34	35+	Ed<12
Model: Parity 2+ vs. 1								
Parity2+ * After	-0.020	-0.010	0.009	-0.017*	-0.005**	-0.001	0.006***	-0.004
	(0.014)	(0.009)	(0.010)	(0.010)	(0.002)	(0.002)	(0.001)	(0.010)
Mean of Dep Var		0.323	0.641	0.738	0.648	0.300	0.0520	0.432
N	37639	1632	1632	1632	1632	1632	1632	1632
Model: Parity 3+ vs. 2								
Parity3+ * After	-0.017	-0.003	0.004	0.006***	-0.025***	0.016***	0.009***	-0.011**
	(0.016)	(0.003)	(0.003)	(0.002)	(0.004)	(0.004)	(0.001)	(0.004)
Mean of Dep Var		0.370	0.593	0.726	0.523	0.402	0.075	0.484
N	25419	1224	1224	1224	1224	1224	1224	1224

Small in magnitude; inconsistent pattern across DD1 and DD3.

The changes in observables are smooth through OBRA93 → less of a concern for our design

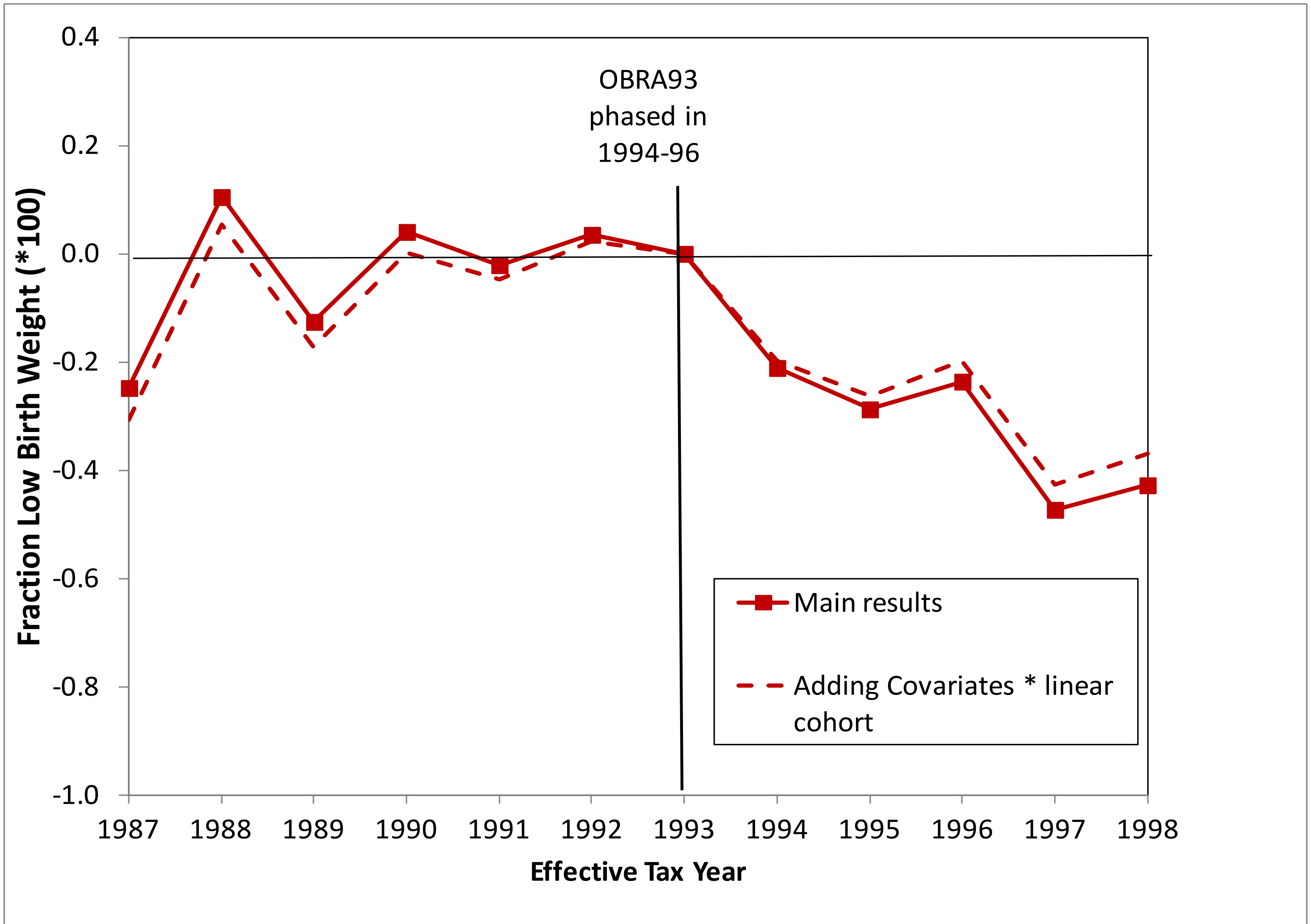


Fraction non-Hispanic



Fraction HS dropout

Suggests a robustness check: Adding control for covariates * linear birth cohort



Magnitudes – Approach 1

Our headline #: $1000 of EITC received -> 7% reduction in LBW

3% for whites, 8% for blacks

Comparison to other studies (ToT per $1000 in 2009$):

- <u>Food stamps:</u> 4% for whites, 2% for blacks *[Almond et al 2011]*
- <u>WIC:</u> 10-20% *[Hoynes et al 2011, and others]*
- <u>Layoffs:</u> 3% *[Lindo 2011]*

Magnitudes – Approach 2

- Almond, Chay and Lee (QJE, 2005) excess hospital charges due to Low BW. Use both x-section & mother FE designs.

- We use to estimate impact of $1000 EITC receipts

	Cross-Section	Mom Fixed Effects
2+ vs. 1 model	$80	$20
3+ vs. 2 model	$245	$95

- This is only hospital charges associated with a birth. They do not reflect subsequent medical costs, the utility value of increased health, or value of educational or income downstream impacts.

Magnitudes – Approach 3 *Aggregate Impacts:* How much did OBRA93 impact LBW births?

- We estimate that among high impact sample, OBRA93 reduces LBW by 0.37 pp (baseline LBW in this sample is 10.2 pp)
- Assume no impacts for non-high impact births
- Assume no impacts for 1st births.
- Do calculation for one year (1996)

Aggregate Impacts for OBRA93 (1996 effective tax year)

	High Impact Sample	Non-high impact sample	All births
Total births	824,400	2,867,573	3,691,973
LBW births	82,761	189,638	272,399
Total births 2+ parity	485,064		
LBW births 2+ parity	50,930		
LBW births 2+ parity w/out OBRA 93	52,720		
Reduction due to OBRA93	1,790	0	1,790

Aggregate Impacts II: How much does EITC overall impact LBW?

- Start w/ maxcredit regressions.
- Calculate mean maxcredit for sample; compare to $0.
- Can also compare to pre-OBRA93 year maxcredit values (1992)
- Again, we do this for one year (1996)

Aggregate Impacts for EITC (1996 effective tax year)

	High Impact Sample	Non-high impact sample	All births
Total births	824,400	2,867,573	3,691,973
LBW births	82,761	189,638	272,399
Reduction due to EITC	4,243	0	4,243
Reduction due to OBRA93 (implied by maxcredit model)	2,166	0	2,166

Methodological check-in #3

Distribution of BW
Mean BW
Gestation, APGAR
Mechanisms: Insurance, smoking, etc

Event Study

2+ vs. 1
3+ vs. 2

Multiple expansions
- Continuous treatment
- Parity time trends

$$LowBW = \beta \cdot Post \cdot HighParity + \cdots$$

Subgroup analysis:
Demographic groups
Deciles of predicted impact

"IV" for interpretation of magnitude
Context re: prior studies
"Economic significance" of magnitudes

Robustness
- Timing Assumptions
- Exclude subgroups
- Vary control variables
- Endog. Fertility checks/controls

Falsification Tests
- Pre-trends
- "Untreated" subgroups

Conclusion

- We use tax reform to identify an exogenous increase in income for low income mothers
- We find the increase in income leads to reductions in LBW births, with larger reductions for black mothers
- Paper highlights potential for identifying important health impacts of non-health safety net programs
- Quantify possible external benefits of the safety net

ADDITIONAL RESULTS

- Average Birthweight
- Robustness table
- Maximum credit models

Other birth outcomes

- Main results examine impacts on low birth weight
- We also examine: average birth weight, pre-term birth, weight-for-age
- These estimate the OBRA93 difference-in-difference models using the “high impact sample”
  - Single women, education <= 12

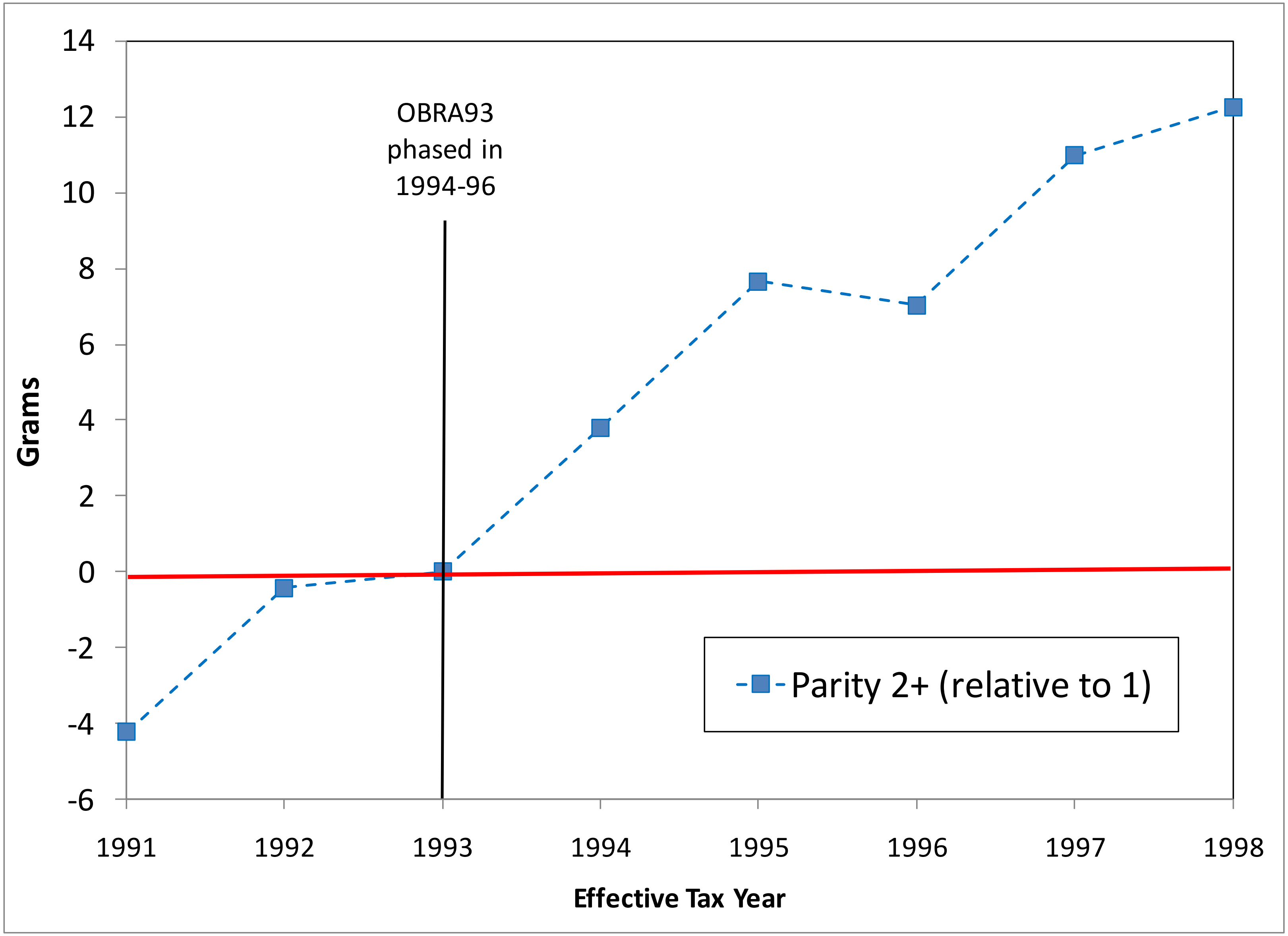
OBRA93, Ave BW
Single Women Ed<=12

	Average Birthweight			
	White	Black	Non-Hispanic	Hispanic
Model: Parity 2+ vs. 1				
Parity2+ * After	4.358**	17.89***	10.76***	2.152
	(2.092)	(3.105)	(2.169)	(3.953)
Mean of the dep. variable	3272.5	3066.4	3175.8	3291.2
N	21775	13780	26066	14823
Model: Parity 3+ vs. 2				
Parity3+ * After	-1.474	17.41***	9.487***	-2.268
	(1.483)	(2.251)	(2.326)	(2.949)
Mean of the dep. variable	3287.8	3067.1	3162.6	3325.1
N	16247	10273	19611	10951

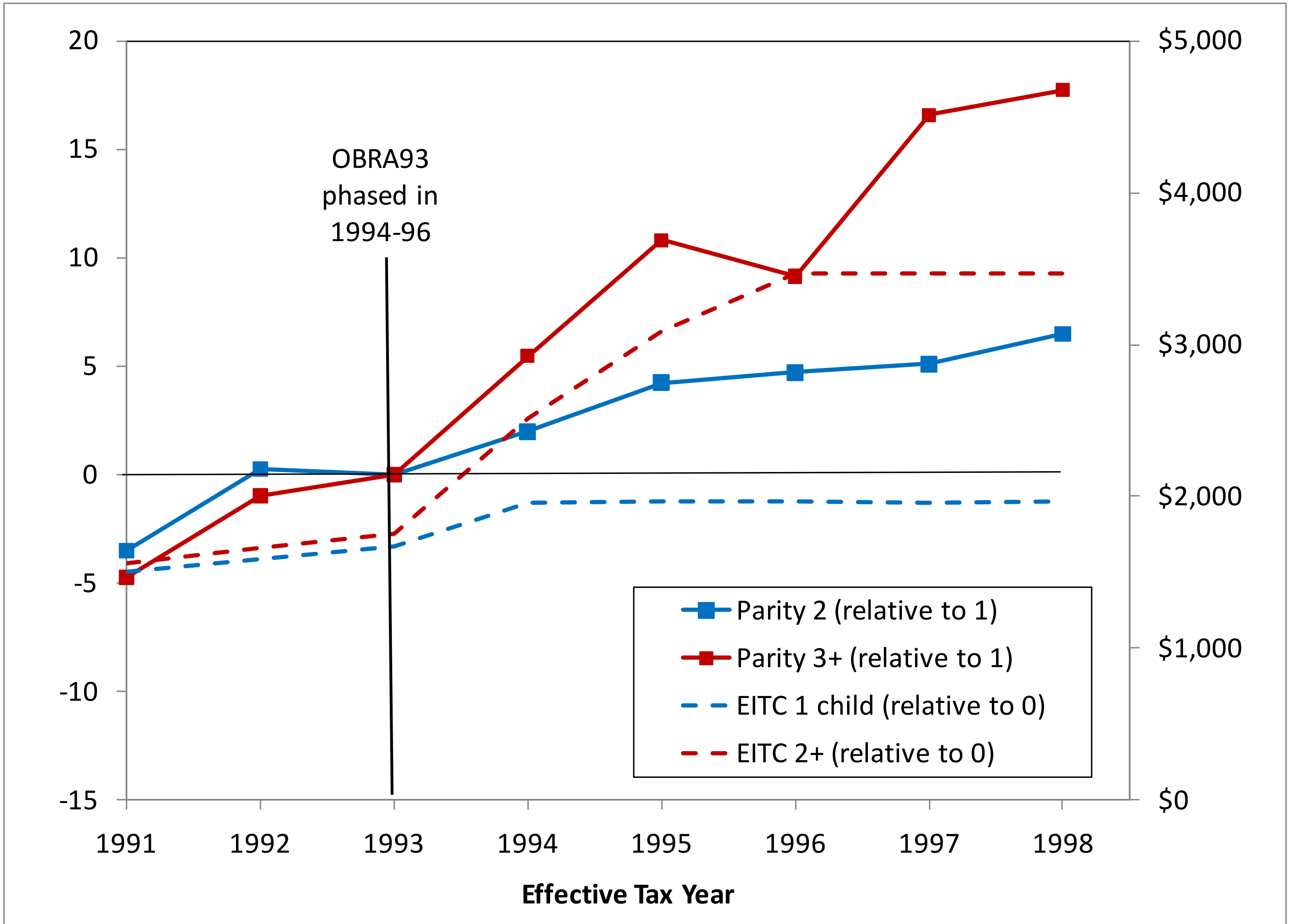
OBRA93, Other outcomes
Single Women Ed<=12

	Preterm birth	Weight for age below 10th p.
DD1	-0.29***	-0.39***
	(0.08)	(0.07)
N	32402	32389
Mean Dep Var	13.9	15.2
DD3	-0.16	-0.22**
	(0.12)	(0.11)
N	21576	21569
Mean Dep Var	15.2	14.4

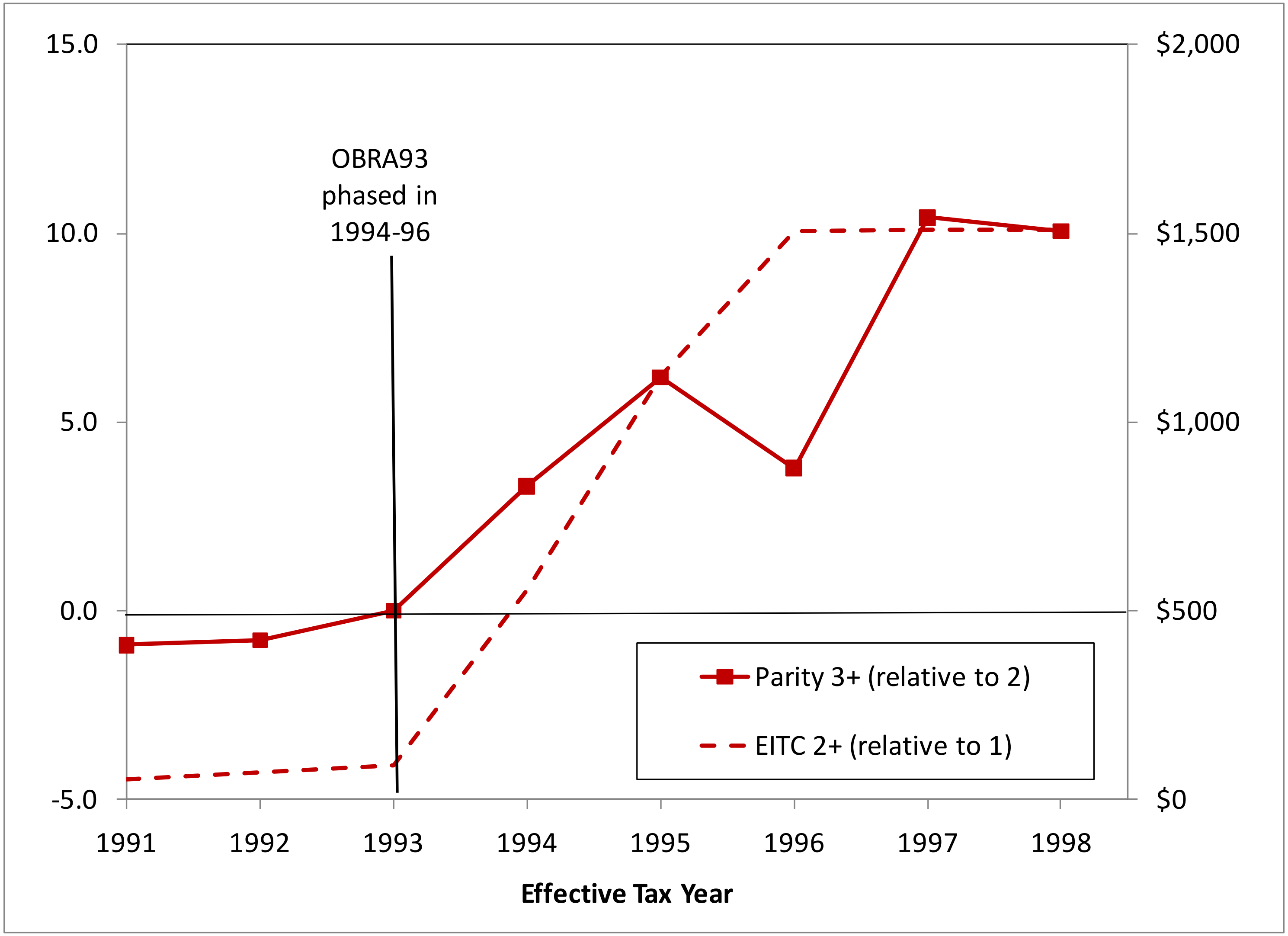
Some concerns about pre-trends for analysis of average birth weight (high impact sample)



Interestingly , similar pre-trend for parity 2 and 3+



As a consequence we have more confidence in the DD3 results for average birth weight



Robustness Results: OBRA93 High Impact Sample

	Drop Mexican born mothers	Assign timing using gestation	Drop parity 4+ births	Drop obs with weight inconsistent with gestation	Balance on education reporting states	Balance on non-imputed marital status states
<u>Model: parity 2+ vs. 1</u>						
2+ kids * after	-0.389***	-0.388***	-0.262**	-0.357***	-0.387***	-0.320**
	(0.0886)	(0.0747)	(0.0769)	(0.073)	(0.085)	(0.0955)
Mean Dep Var	10.68	10.17	9.558	10.22	10.92	10.80
N	47184	47722	36136	47,506	42,258	41424
<u>Model: parity 3+ vs. 2</u>						
3+kids * after	-0.385***	-0.376***	-0.223***	-0.323***	-0.332**	-0.320***
	(0.0824)	(0.0716)	(0.0621)	(0.068)	(0.099)	(0.0898)
Mean Dep Var	11.37	10.69	9.696	10.74	11.66	11.50
N	35145	35488	23916	35,326	31,438	30778

Panel FE estimates using multiple EITC expansions

- Regress birth outcomes on a measure of EITC generosity (maximum credit).
  - Allows us to use variation from multiple expansions, tax acts in 86, 90, 93
  - Allows us to expand sample to effective tax years 1984-1998.
  - Identification comes from changes in the maximum credit over time and between parities.
- Cluster on state, weight using number of births

$$Y_{pjst} = \alpha + \delta Maxcredit_{pt} + \beta X_{st} + \gamma_p + \eta_s + \delta_t + \phi_j + \varepsilon_{st}$$

MAXCREDIT model, Percent LBW
Single Women Ed<=12

	All		White		Black	
Maximum Credit ($1000 of 95$)	-0.307***	-0.774***	-0.119**	-0.0842	-0.518***	-1.359***
	(0.0659)	(0.127)	(0.0528)	(0.107)	(0.115)	(0.179)
Parity * linear time		X		X		X
State x year controls	X	X	X	X	X	X
Mean of dependent variable	11.21	11.21	8.810	8.810	14.76	14.76
N	81782	81782	37335	37335	23746	23746
1st stage impact of maxcredit on ave EITC	0.330	0.330	0.330	0.330	0.330	0.330
Treatment on Treated per $1000 (2009$)	-0.66	-1.67	-0.26	-0.18	-1.12	-2.93
ToT per $1000 (2009$), % impact	-5.9%	-14.9%	-2.9%	-2.1%	-7.6%	-19.8%

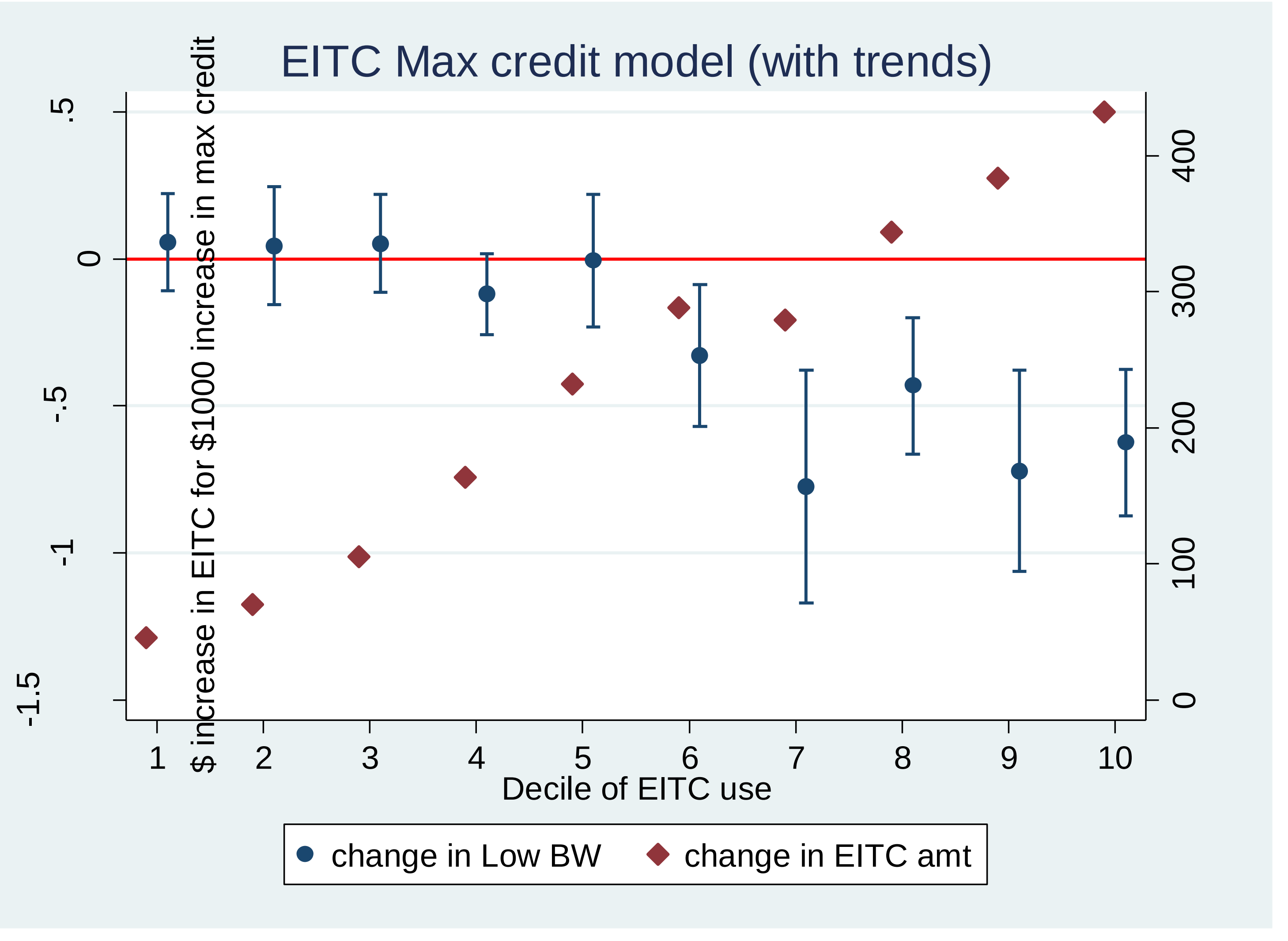
Because of the longer time period and the multiple reforms, we can examine sensitivity to adding parity linear time trends to the model.

As with before, larger effects for blacks.

Magnitudes for models w/o trends are quite similar to those in the OBRA93 design. (All 7%, White 4%, Black 8%)

Much larger with trends.

Full Sample, Stratify by EITC Decile



Magnitudes for MAXCREDIT model

- Model gives estimate of the impact of a $1000 increase in the maximum credit parameter on birth outcomes.
- This is a policy parameter → we need to convert this to the impact of $1000 received on birth outcomes.
- Our approach is to estimate a “first stage”:
  - Go back to our CPS/TAXSIM sample. Calculate eligible EITC amount for each observation.
  - Collapse to tax year x parity cell (=tax schedule).
  - Regress cell average EITC amount on max credit, parity and tax year.
  - Use coef on maxcredit to scale up the estimates
- (Maintained assumption) Effects operate through income received from EITC.