

Distributional Impacts of the Self Sufficiency Project

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Introduction

- Government assistance for low income single parents has seen dramatic reform in North America and Europe over the past 10-15 years
- Common element of welfare reform and EITC (US), Working Family Tax Credit (UK), and Self Sufficiency Project (Canada) is increasing the financial gains to work or *making work pay*
- A large literature has developed, examining the impact of these reforms on labor market outcomes and family well-being
 - Literature focuses on mean impacts (average treatment effects) overall and in subgroups
- We move beyond mean impacts and examine the impact of the Canadian SSP project on the distribution of earnings, transfers and income using *quantile treatment effects* (QTEs)

- Why move beyond mean impacts?
 - Labor supply theory implies heterogeneous responses
 - Substantive policy interest
 - Simple to do, nonparametric estimator (QTE)
- Why the Canadian SSP?
 - Our previous paper (“What mean impacts miss...”, *AER* September 2006) found important distributional impacts of welfare reform in the US
 - SSP is unique: provides a generous earnings subsidy for full-time work and has been found to substantially increase earnings and income; has influenced policy
 - Opportunity to look at impacts on wages and hours—these are not provided in the US welfare experiments

Overview of presentation

- Policy Setting (IA, SSP, earnings incentives)
- Predictions from labor supply theory
- Empirical methodology
- SSP Evaluation and data
- Estimate quantile treatment effects (QTE)
 - Compare distribution in treatment and control groups
 - Examine impacts on earnings, transfers and income
- Results show heterogeneity is important:
 - Consistent with theoretical predictions
 - Could not be revealed using mean impacts

- Preview of results ...

Figure 2: Distribution of Monthly Earnings for SSP and IA-Only Groups, Months 1-48

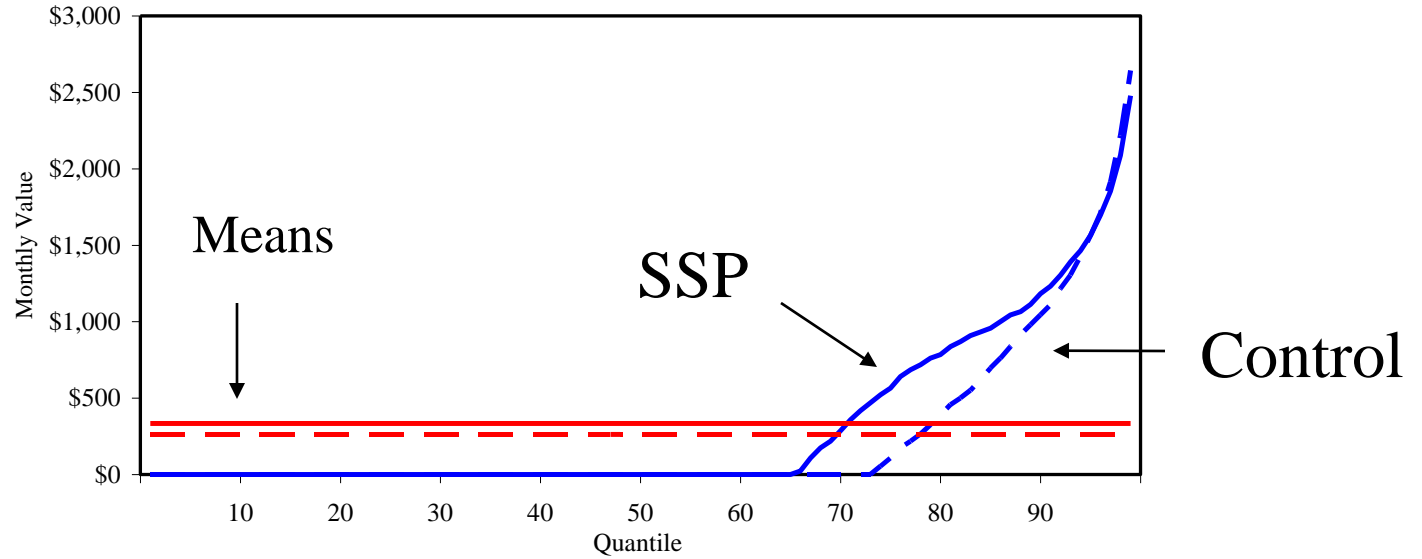
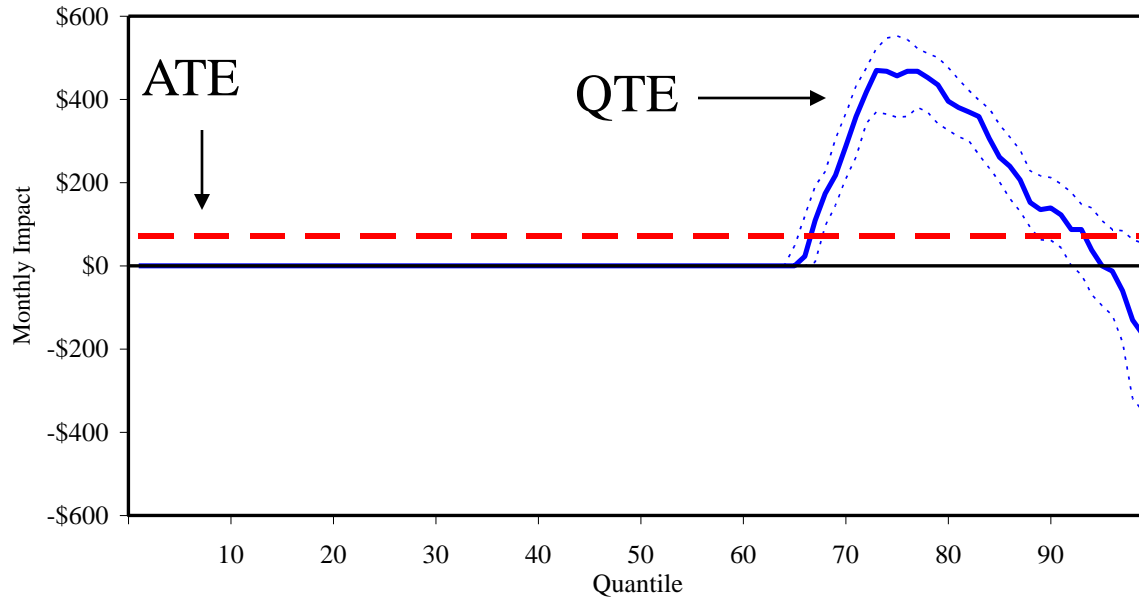


Figure 3: SSP Quantile Treatment Effects on Distribution of Monthly Earnings, Months 1-48



Policy Setting: Income assistance and SSP

The SSP Experiment

- Random assignment of welfare recipients to:
 - Treatment Group: Could obtain SSP (and/or IA)
 - Control Group: had access only to Income Assistance (IA)
- Goal of SSP: Increase work among low income long term welfare recipients
- The experiment offered treatment group members who worked full time a generous time-limited earnings supplement
- The supplement is available to long term welfare recipients (receive IA in at least 12 of the last 13 months)
- Prior estimates of mean impacts show that SSP led to more employment, earnings, and income during the supplement period but had little or no effect later

Income Assistance (control group program)

- Canada's universal safety net program
- Means tested; eligibility and benefit levels vary by province; all family types are eligible
- Benefits resemble traditional income support program (guaranteed income, phased out as earnings increase)
- Generous program with high implicit tax rate → usual concern about disincentives to work

1992 Program Values (Canadian dollars)

	Monthly Guarantee	Phase out of benefits
British Columbia	\$1,146	75% tax rate after \$200/month (100% after 12 months)
New Brunswick	\$739	100% tax rate after \$200/month

SSP Earnings Supplement (Treatment group)

- Goal: reform welfare and increase work among single mothers
- Earnings subsidy with minimum hours restriction (and limited time period for determining eligibility)
- Minimum hours restriction: To receive benefit must work fulltime (≥ 30 hrs/wk over past 4 wks) at one or more jobs paying \geq minimum wage
- Supplement = $0.5 * (\text{Benchmark Earnings} - \text{Earnings})$
Benchmark: \$37,000/yr BC; \$30,000/yr NB
- Limited period: Eligibility (fulltime work) must be established within 12 months; SSP could then be received for 3 years
- Can not receive IA and SSP simultaneously; treatment group could always go back to IA (even after end of SSP period)

Illustration: SSP leads to substantial increases in income

	Income if H=0	Income if assigned to IA, Hours=30	Income if assigned to SSP, Hours=30	Difference in income if H=30 (SSP-IA)			
	IA	Earnings	IA	Earnings	SSP	Diff	% Diff
<u>British Columbia</u>							
\$5.50/hr (min wage)	\$1,100	\$714	\$595	\$714	\$1,184	\$589	45%
\$8.00/hr	\$1,100	\$1,039	\$270	\$1,039	\$1,022	\$752	57%
<u>New Brunswick</u>							
\$5.50/hr (min wage)	\$860	\$714	\$345	\$714	\$893	\$548	52%
\$8.00/hr	\$860	\$1,039	\$20	\$1,039	\$730	\$710	67%

All figures are monthly.

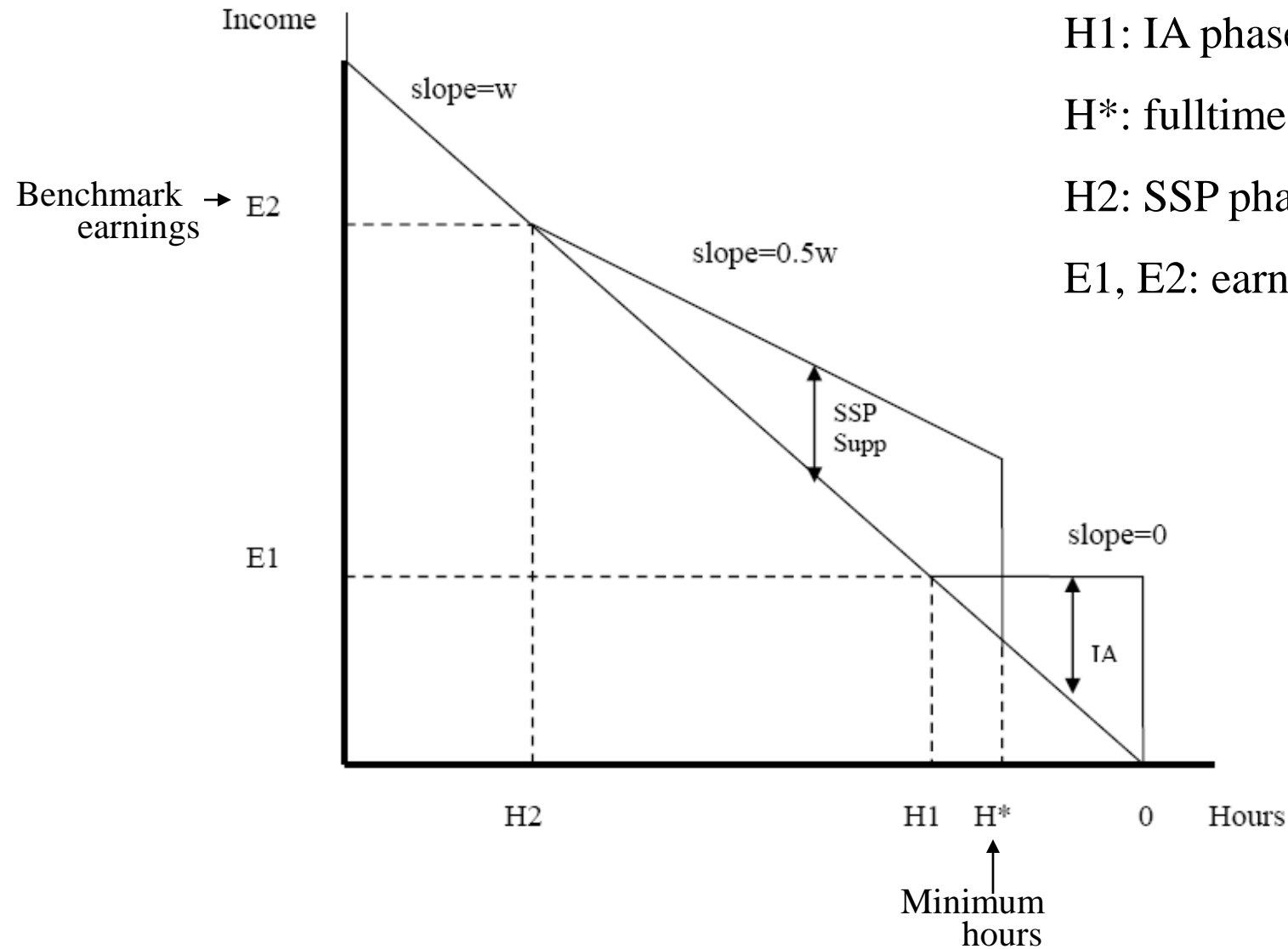
Under IA, financial gains to work were minimal

SSP increases the returns to working substantially

Predictions of Labor supply theory

[Begin with static labor supply model; wages given; can freely choose hours]

Stylized IA/SSP budget constraint



H1: IA phase-out

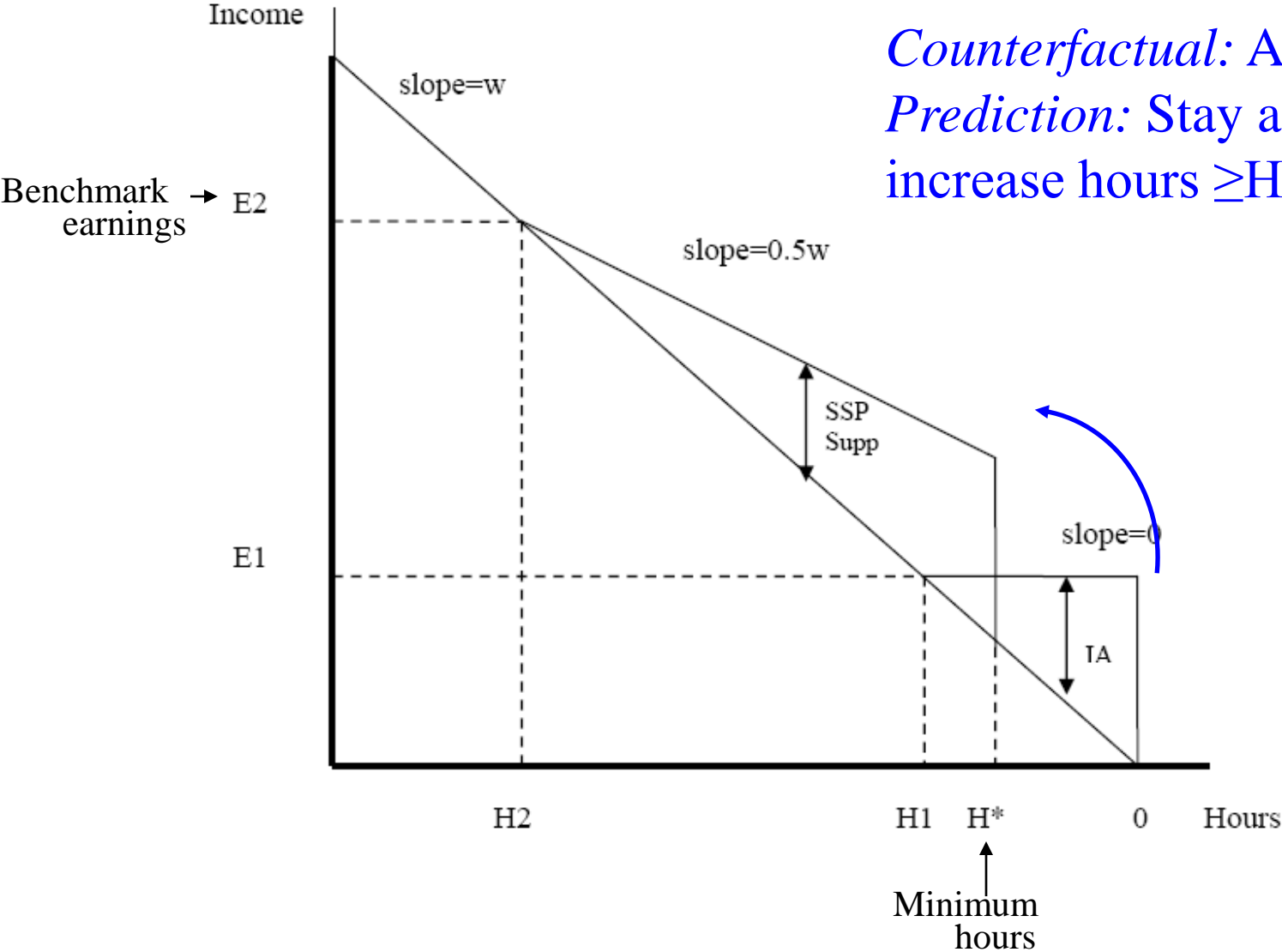
H*: fulltime work restriction

H2: SSP phase-out

E1, E2: earnings phase-outs

Case 1: On IA, does not work

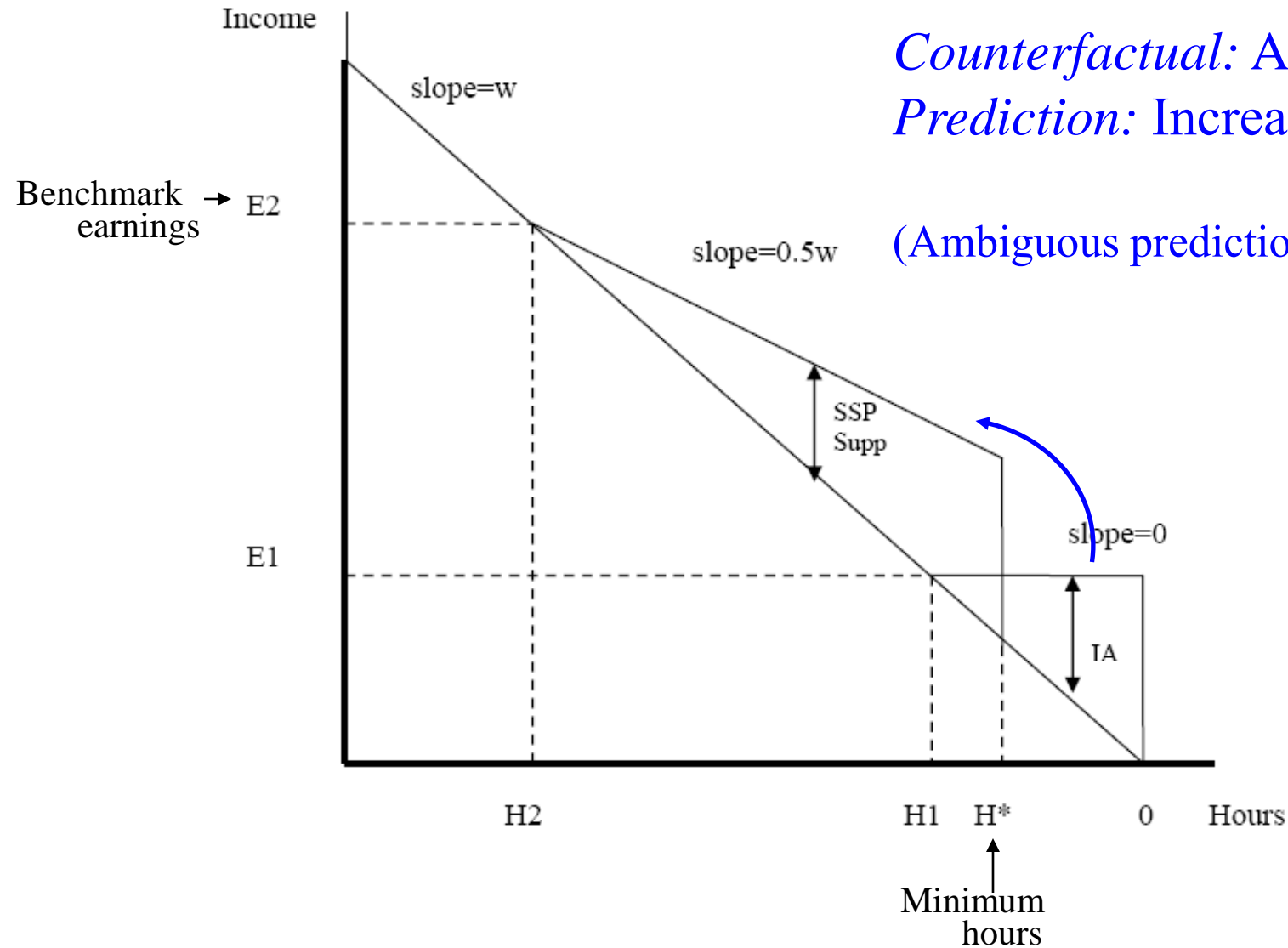
Counterfactual: Assigned to SSP
Prediction: Stay at $H=0$ or increase hours $\geq H^$*



Case 2: On IA, works $\leq H1$

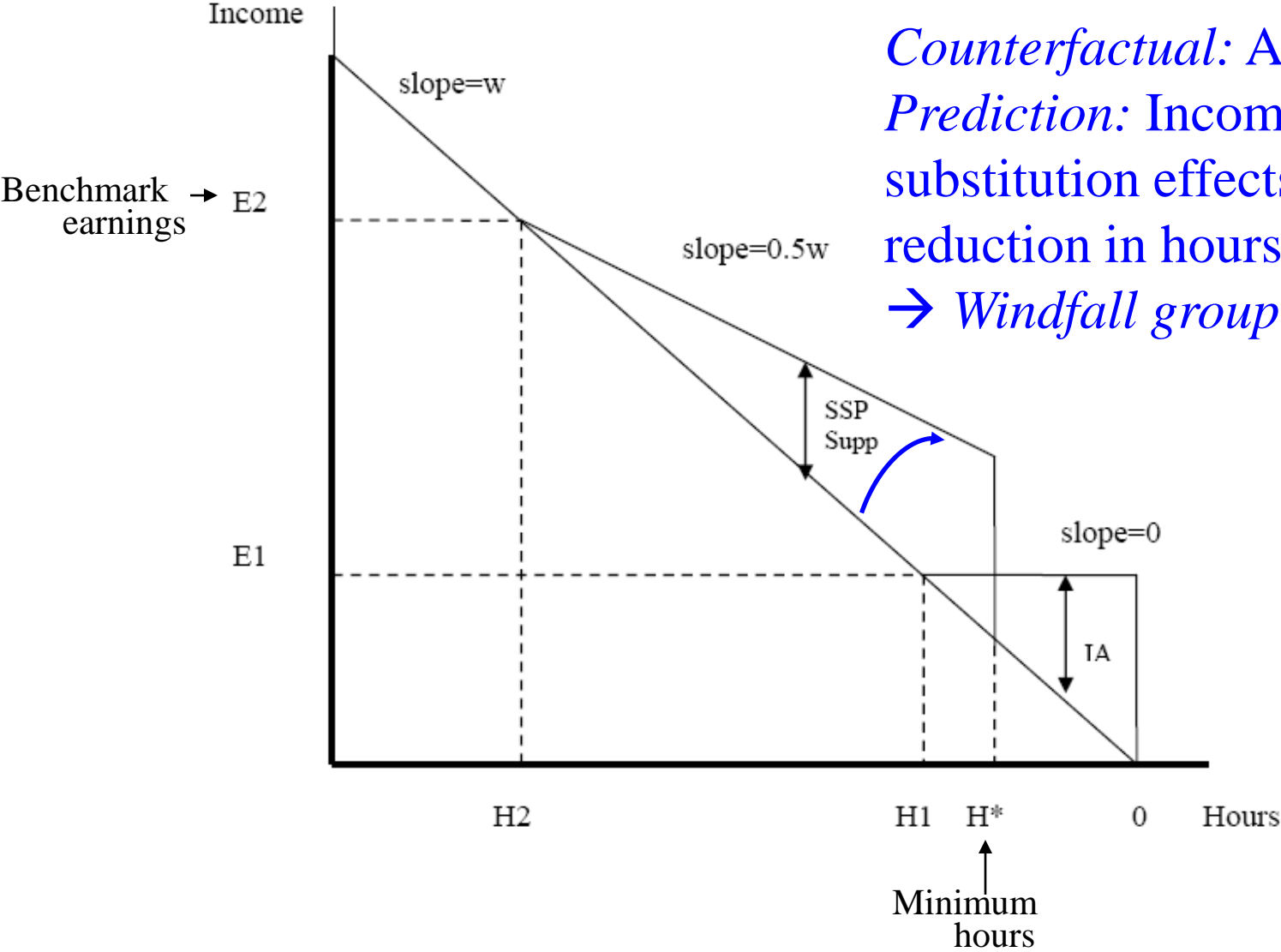
Counterfactual: Assigned to SSP
Prediction: Increase hours $\geq H^$*

(Ambiguous prediction if $H^* \leq H \leq H1$)



Case 3: On IA, eventually leaves and works $H1 \leq H \leq H2$

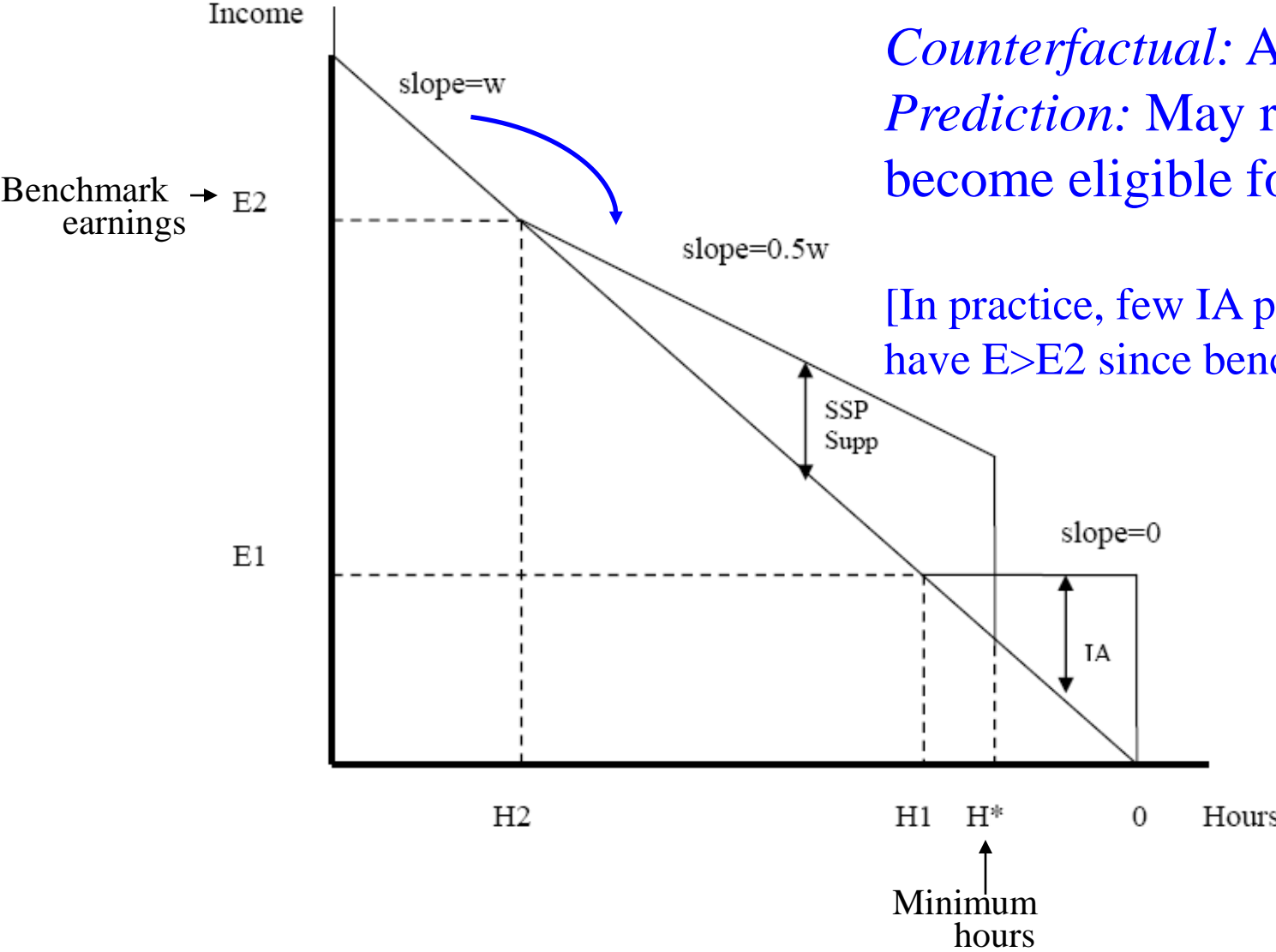
Counterfactual: Assigned to SSP
Prediction: Income and substitution effects lead to reduction in hours
→ Windfall group



Case 4: On IA, eventually leaves and works $H \geq H_2$

Counterfactual: Assigned to SSP
Prediction: May reduce hours to become eligible for SSP

[In practice, few IA participants will have $E > E_2$ since benchmark is so high.]



Summary: What impacts do we expect from SSP (compared to IA)?

- Employment should increase
- Generous supplement should increase transfers
- High earners may reduce their labor supply
- Expected effects vary according to individuals' location on the budget set; means may mask positive and negative effects

SSP and Dynamic Search Model (Card and Hyslop 2004)

- Limited eligibility leads to more search intensity
- May lead women in SSP to accept jobs with lower offer wage compared to control group (as they reach end of eligibility period)
- Existence of wage floor (minimum wage) implies that reduction in offer wages may be concentrated at the upper end of the wage distribution

Summary: Expected Effects of SSP Supplement

Location if assigned to IA	Effect on Distribution of:		
	Earnings	Transfers	Income
$H=0$	0/+	0/+	0/+
$0 \leq H \leq H1$	+	+	+
$H1 \leq H \leq H2$	-	+	+
$H \geq H2$	-/0	+/0	-/0

- Predicted effects of SSP are heterogeneous
- Mean effects may mask positive and negative effects

Empirical Methodology

Methodology: Potential Outcomes Framework

- Y_{0i} = person i 's outcome when not treated
- Y_{1i} = person i 's outcome when treated
- The evaluation problem is that we never see both outcomes for any person
- Treatment effect is $\Delta_i = Y_{1i} - Y_{0i}$
- Under random assignment, average treatment effect is estimated by the difference in means
- Average treatment effect is nonparametric, unbiased estimate of mean treatment effect

Methodology: Treatment effect on distribution and quantile treatment effects

- We can always estimate marginal distributions for Y in the treatment and control groups

$F_t(y)$ = CDF of Y for treatment ($t=1$) and control ($t=0$) groups

$y_q(t)$ = q th quantile of the $t=0,1$ distributions

- We can measure the q th quantile treatment effect (QTE) as:

$$QTE_q = y_q(1) - y_q(0)$$

- Simple difference between quantiles of the treatment and control distribution
- Nonparametric; natural distributional analog to mean impact
- Random assignment provides only assumption needed to validate the estimator

What the QTE *IS* and *IS NOT*

- The QTE measures the impact of the treatment on the distribution
 - For example, how does SSP affect the 25th percentile of the earnings distribution, the median, the 75th percentile?
 - These comparisons are important in policy evaluation where outcomes in two different regimes are compared and social welfare calculations are applied
- It does not measure the distribution of treatment effects or quantiles of the distribution of treatment effects
 - Of course, under a rank preservation assumption we can recover the distribution of treatment effects from the QTE
 - We empirically examine the validity of the rank preservation assumption

Evaluation and Data

The SSP Experiment and Data

- Experiment:
 - Random assignment Nov 1992 – March 1995; participants followed up for 54 months after RA
 - Two provinces: British Columbia and New Brunswick
- Data:
 - Monthly administrative data on IA & SSP participation and payments for pre and post-RA period
 - Survey data (baseline, 18, 36, 54 months) for monthly employment, earnings, usual hours, and hourly wages
 - Demographics collected at baseline
- Sample:
 - We use data from the *SSP Recipient Sample*, consisting of about 5,685 single parents aged 19 or older who had been on IA for at least 12 of the last 13 months
 - We drop those with incomplete data on earnings, hours and wages for months 1–54. Final sample is 3,875 observations (1,991 SSP; 1,884 IA)

Estimation Details

- Unit of observation is the person-month (3,875 persons x 54 months=209,250 observations)
- Bootstrap standard errors, account for within person variation (block bootstrapping; 1,000 replications)
- Two time periods examined:
 - Months 1-48 (maximum period where SSP could be received; 12-month eligibility & 36-month receipt)
 - Months 49-54 (after SSP)
- Comparison of pre-random assignment characteristics among treatment and control groups shows that the samples are balanced and random assignment was valid (Table 1). In addition, QTE on pre-RA period shows no differences between T and C groups.

Table 2: Mean Impacts

<i>Monthly</i>	<u>Months 1–48</u>			<u>Months 49–54</u>		
	SSP Mean	IA Mean	Difference	SSP Mean	IA Mean	Difference
Earnings	334	263	72***	455	423	32***
Wkly Hrs	10.7	7.8	2.9***	12.7	11.3	1.3***
Ave. Wage	2.69	2.25	0.44***	3.49	3.28	0.22***
IA	586	659	-73***	440	474	-34***
IA+SSP	718	659	58***	441	474	-33***
Total Inc.	1,052	922	130***	896	897	-1
N	95,568	90,432		11,946	11,304	

Treatment effects
during SSP receipt



Treatment effects
after SSP receipt



QTE Results:

- Start with SSP period, months 1-54
- Present QTE for monthly outcomes:
 - Earnings
 - Hours/week (averaged across all jobs in a month, 0 if do not work)
 - Hourly wage (averaged across all jobs in a month, 0 if do not work)
 - Transfers (IA+SSP)
 - Total Income (earnings+transfers)
- 90 percent confidence intervals

Figure 2: Distribution of Monthly Earnings for SSP and IA-Only Groups, Months 1-48

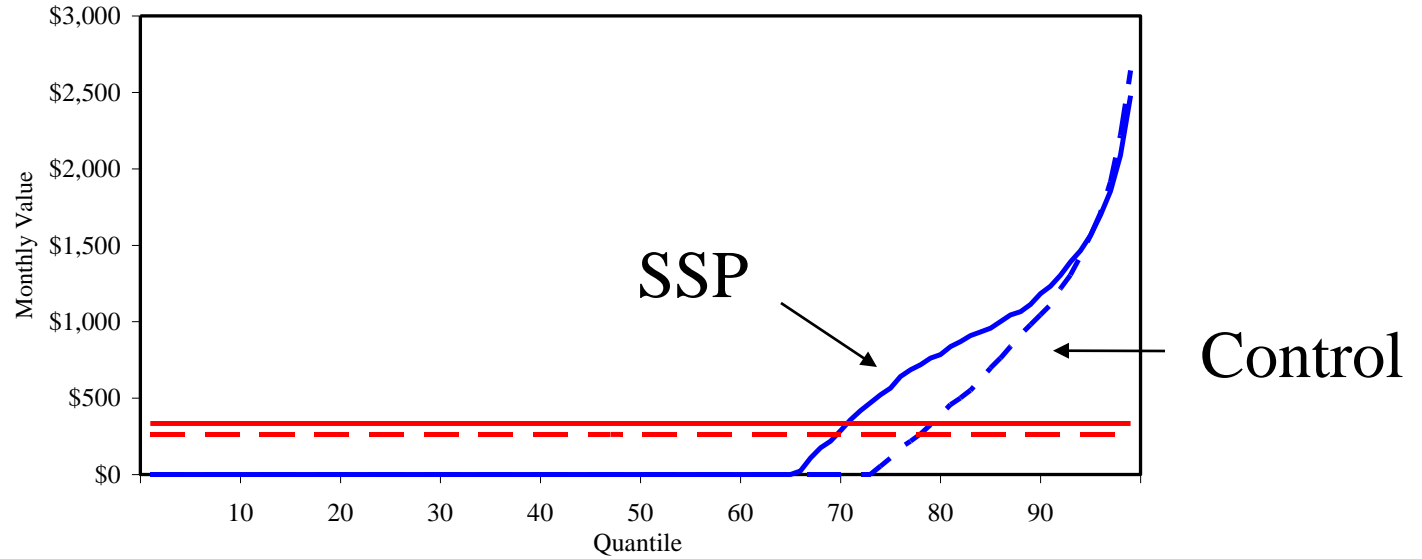


Figure 3: SSP Quantile Treatment Effects on Distribution of Monthly Earnings, Months 1-48

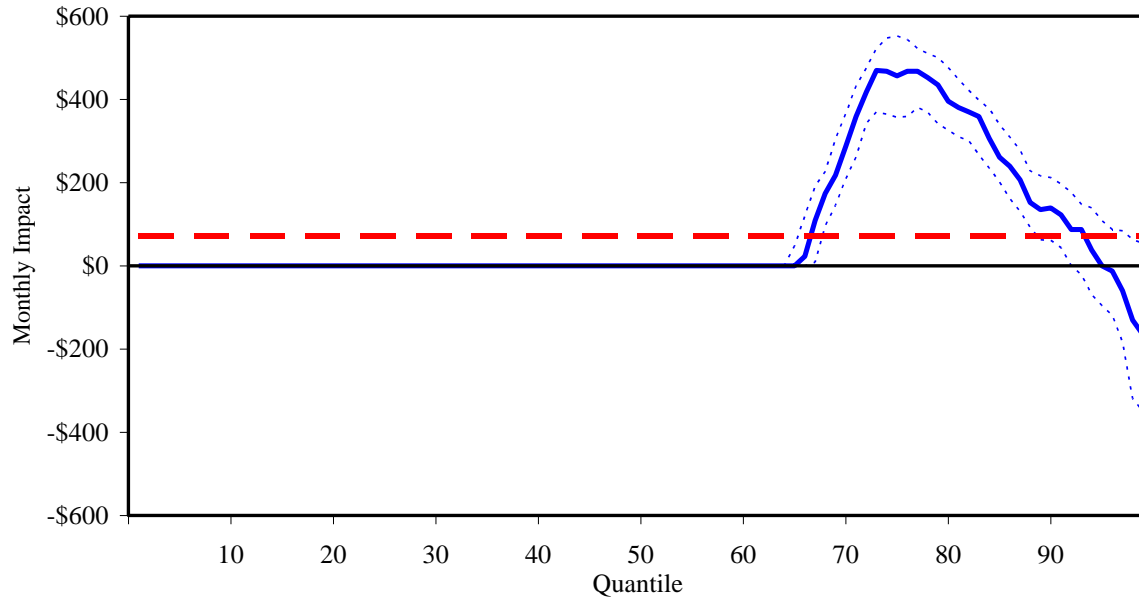
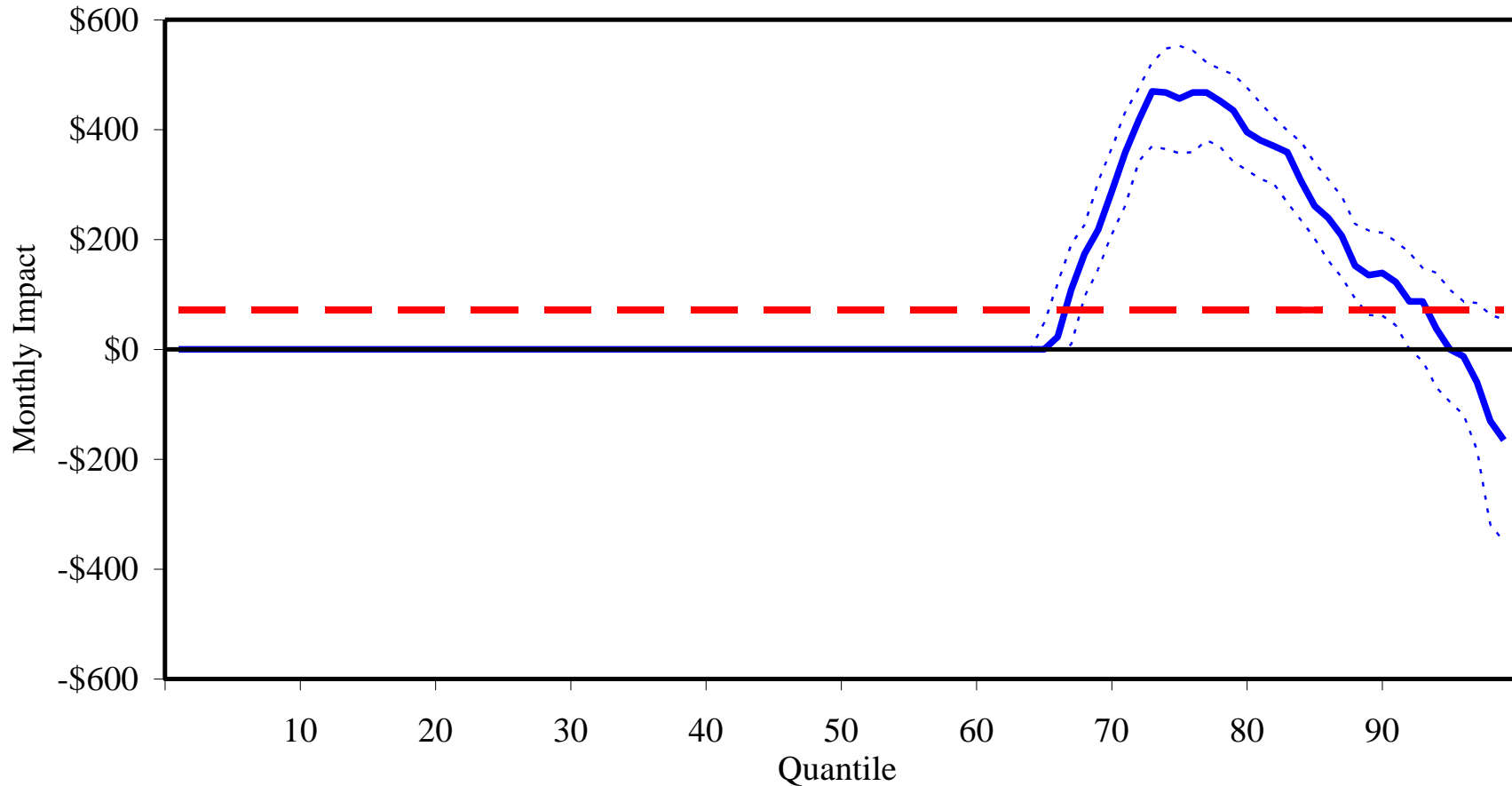
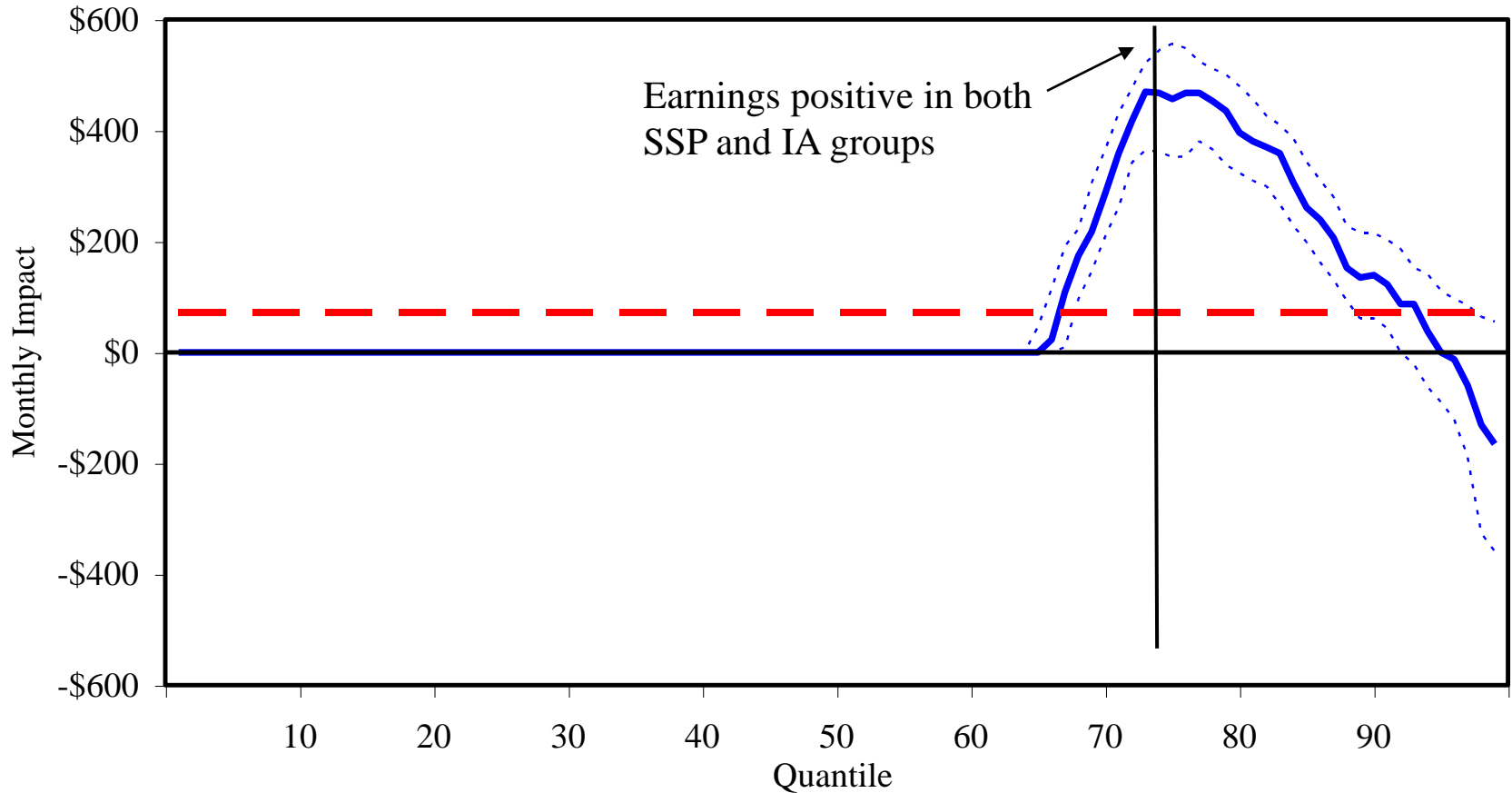


Figure 3: SSP Quantile Treatment Effects on Distribution of Monthly Earnings, Months 1-48



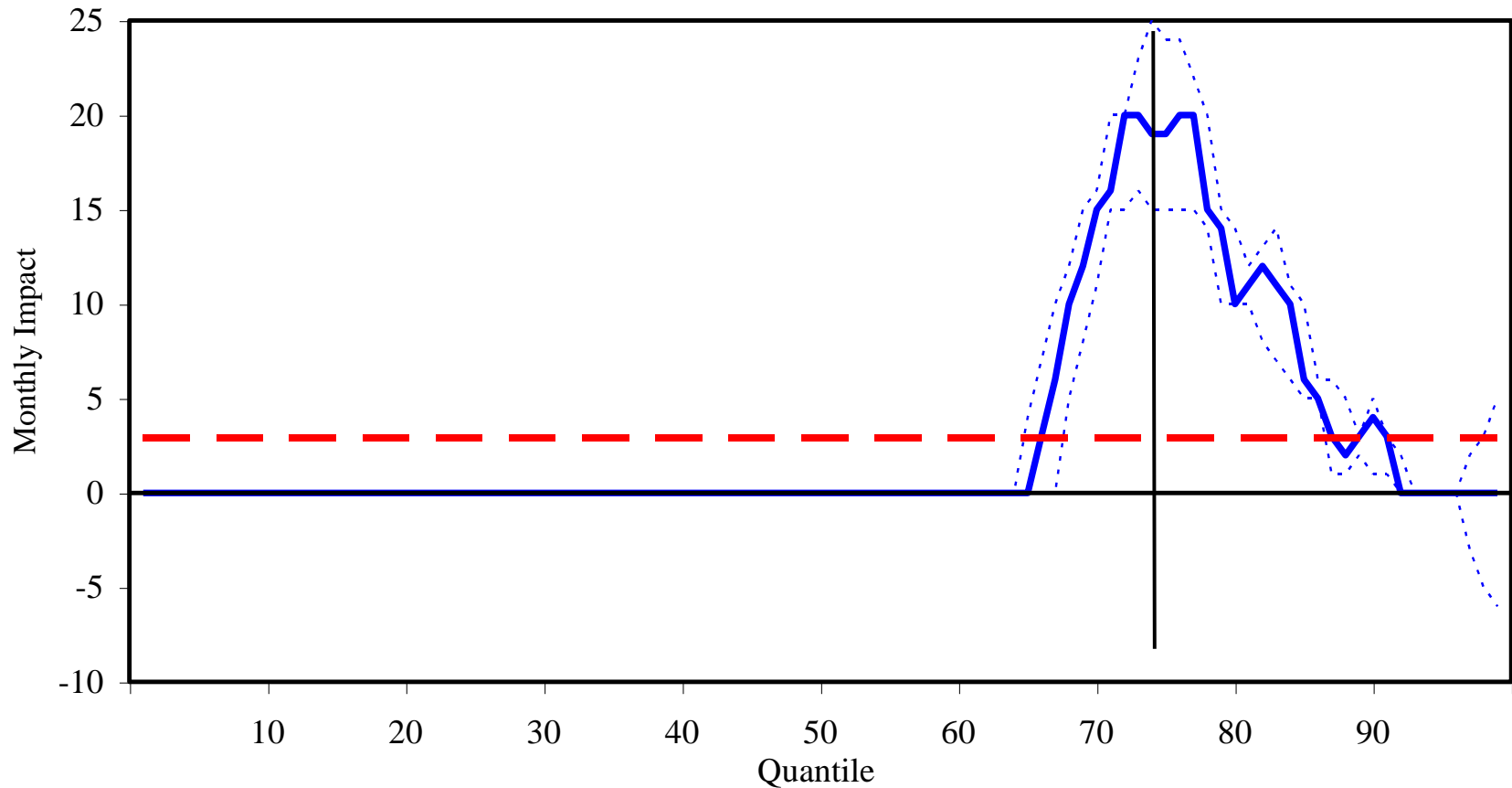
- Wide range of QTE: $-\$165$ to $\$470$ compared to mean impact
- Pattern consistent with labor supply predictions (although not statistically significant at the top)

Figure 3: SSP Quantile Treatment Effects on Distribution of Monthly Earnings, Months 1-48



- Part of this is illustrating an employment effect. But the pattern is consistent with an intensive margin effect as well.

Figure 4: SSP Quantile Treatment Effects on Distribution of Weekly Hours, Months 1-48

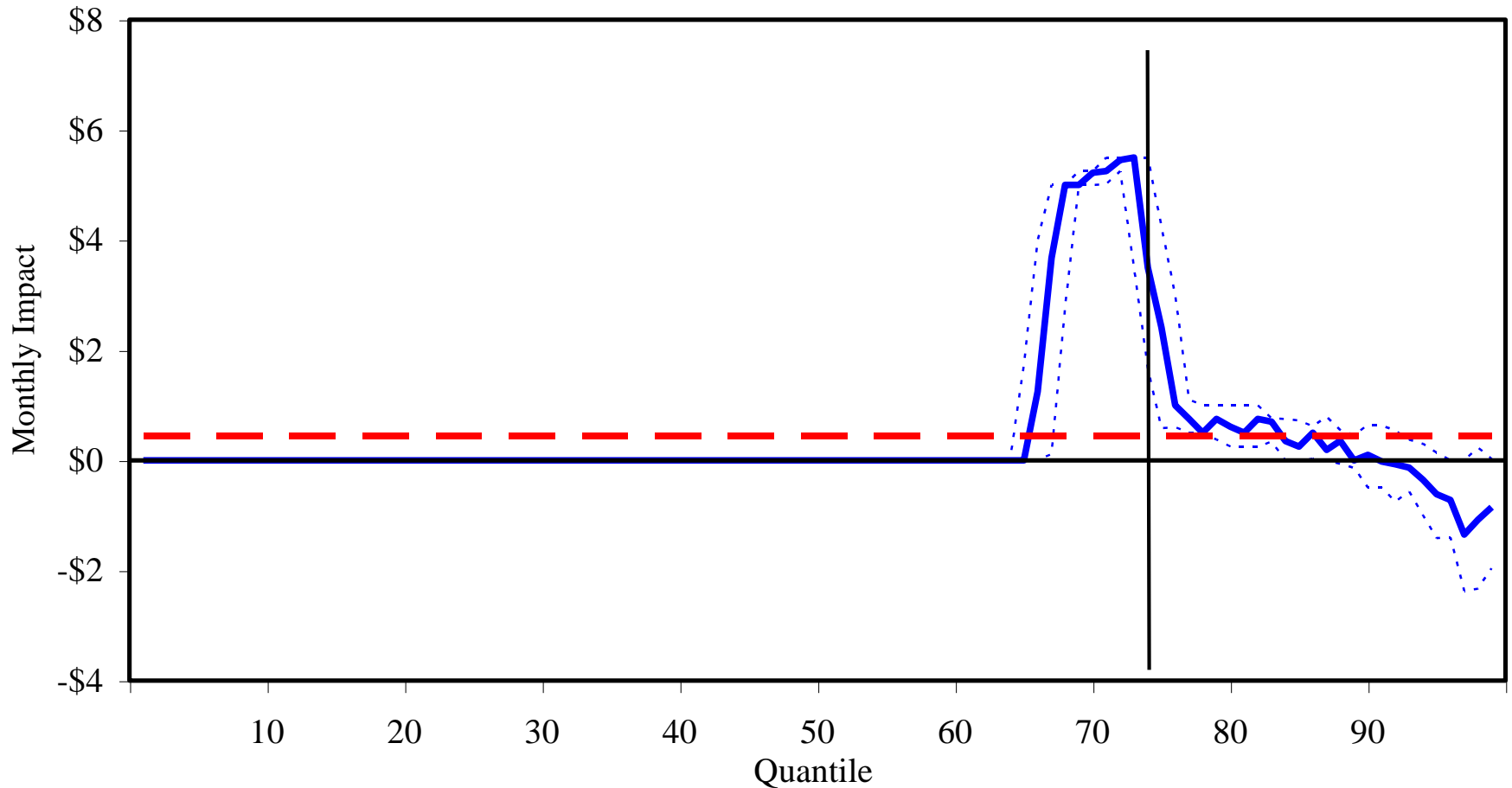


- Again, pattern consistent with labor supply predictions; smaller labor supply effects for “windfall” group and none at the very top.

Why no labor supply decline at the top of the distribution?

- SSP is very generous; annual earnings must exceed \$37,000 (\$30,000) in BC (NB) to be ineligible. Only 3-5% of the control group ever has monthly earnings above this level.
- SSP requires 30 hours of work; this constrains the hours response
- Because of tapering out of the SSP subsidy, the benefit near the breakeven point is small.

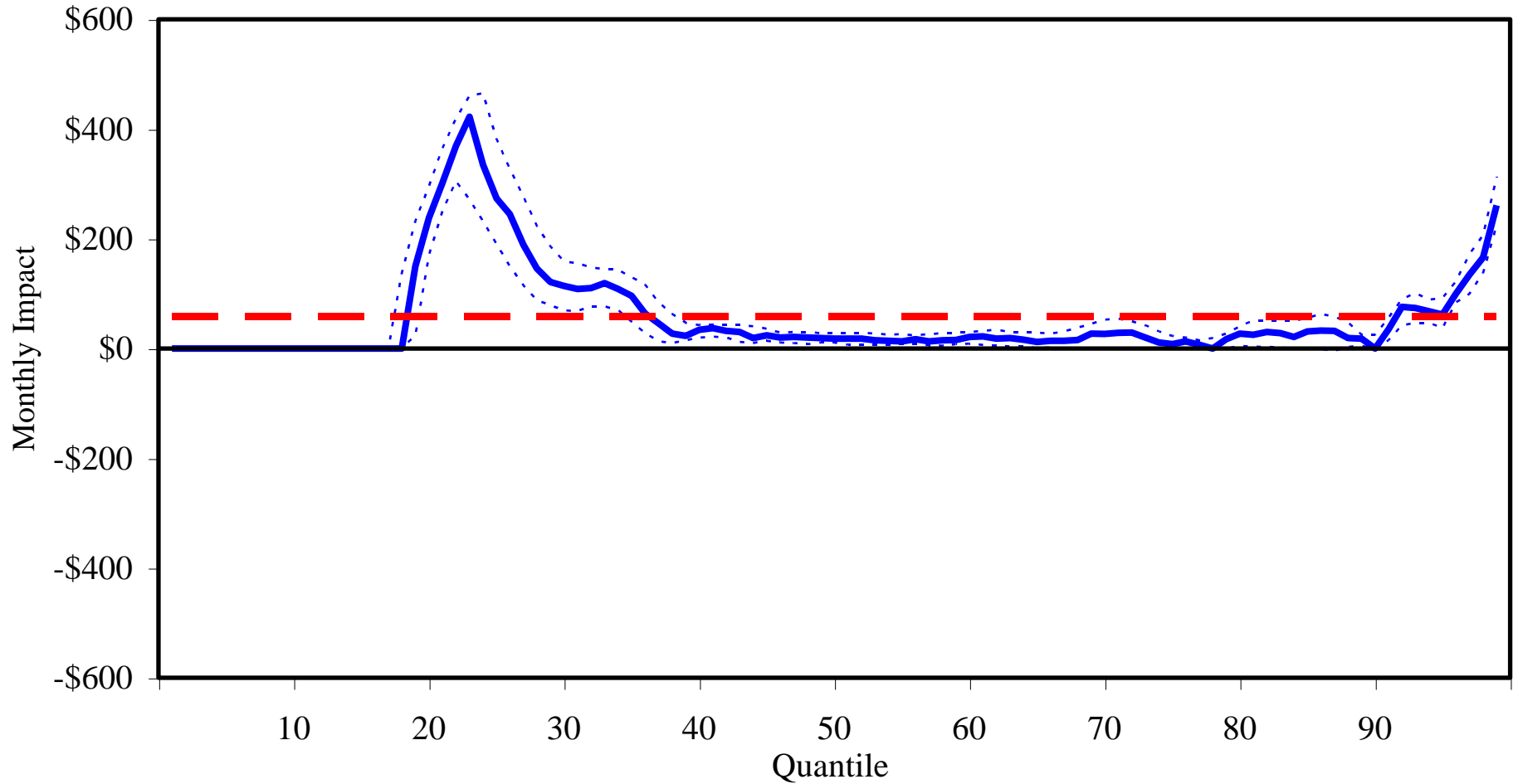
Figure 5: SSP Quantile Treatment Effects on Distribution of Average Hourly Wages, Months 1-48



- Strong evidence that SSP led to reduction in wages at the top of the distribution. This was expected as the higher skill workers had more scope to reduce wages without falling below the minimum wage.

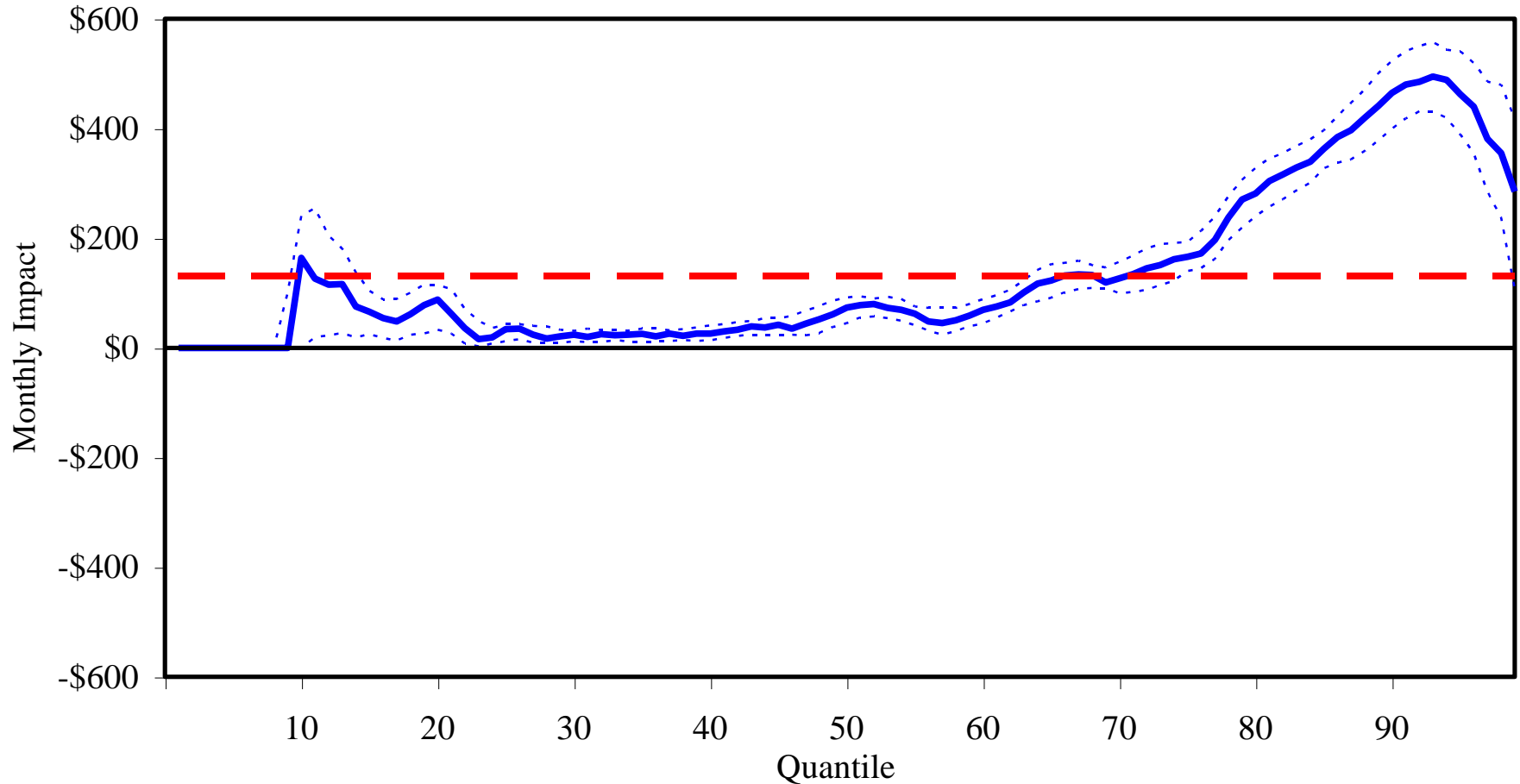
Figure 7: SSP Quantile Treatment Effects on Distribution of Transfers (IA + SSP)

Months 1-48



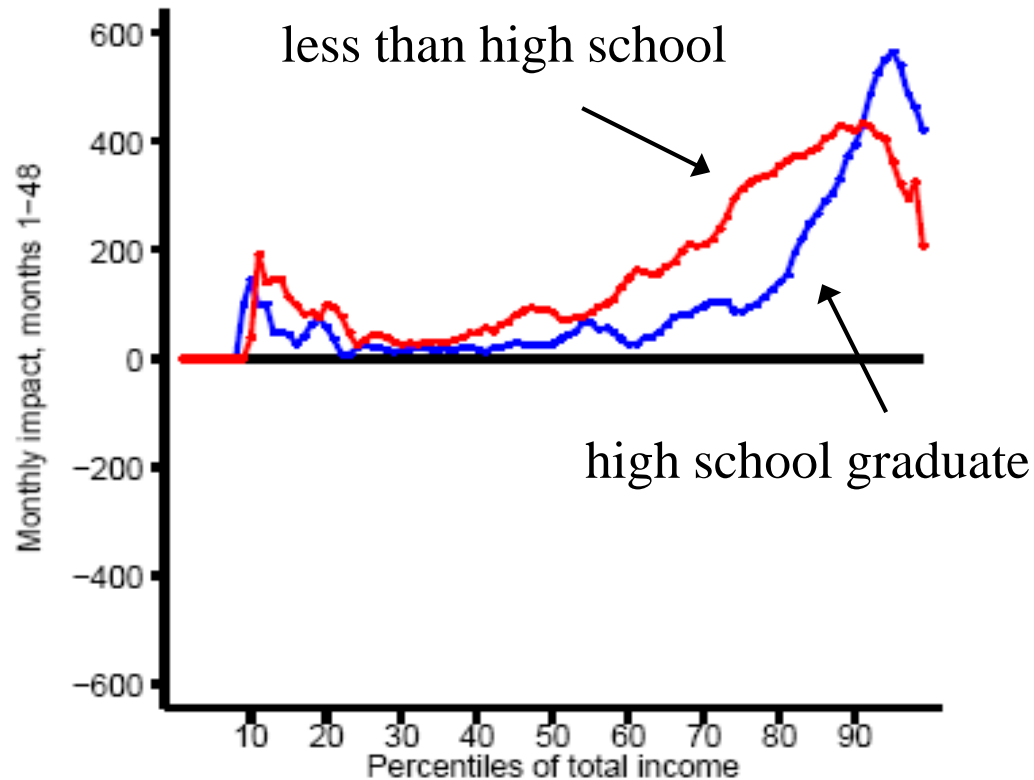
- All nonnegative, reflecting generosity of SSP
- Positive impacts concentrated at the bottom of the transfer distribution (\approx top of the earnings distribution)

Figure 9: SSP Quantile Treatment Effects on Distribution of Total Income
Months 1-48



- Substantive and statistically significant differences across the distribution. Gains in income concentrated in the top 1/3 of the distribution. Little gain in the bottom half of the distribution.

QTE on Total Income Months 1-48, Differences by Education Group



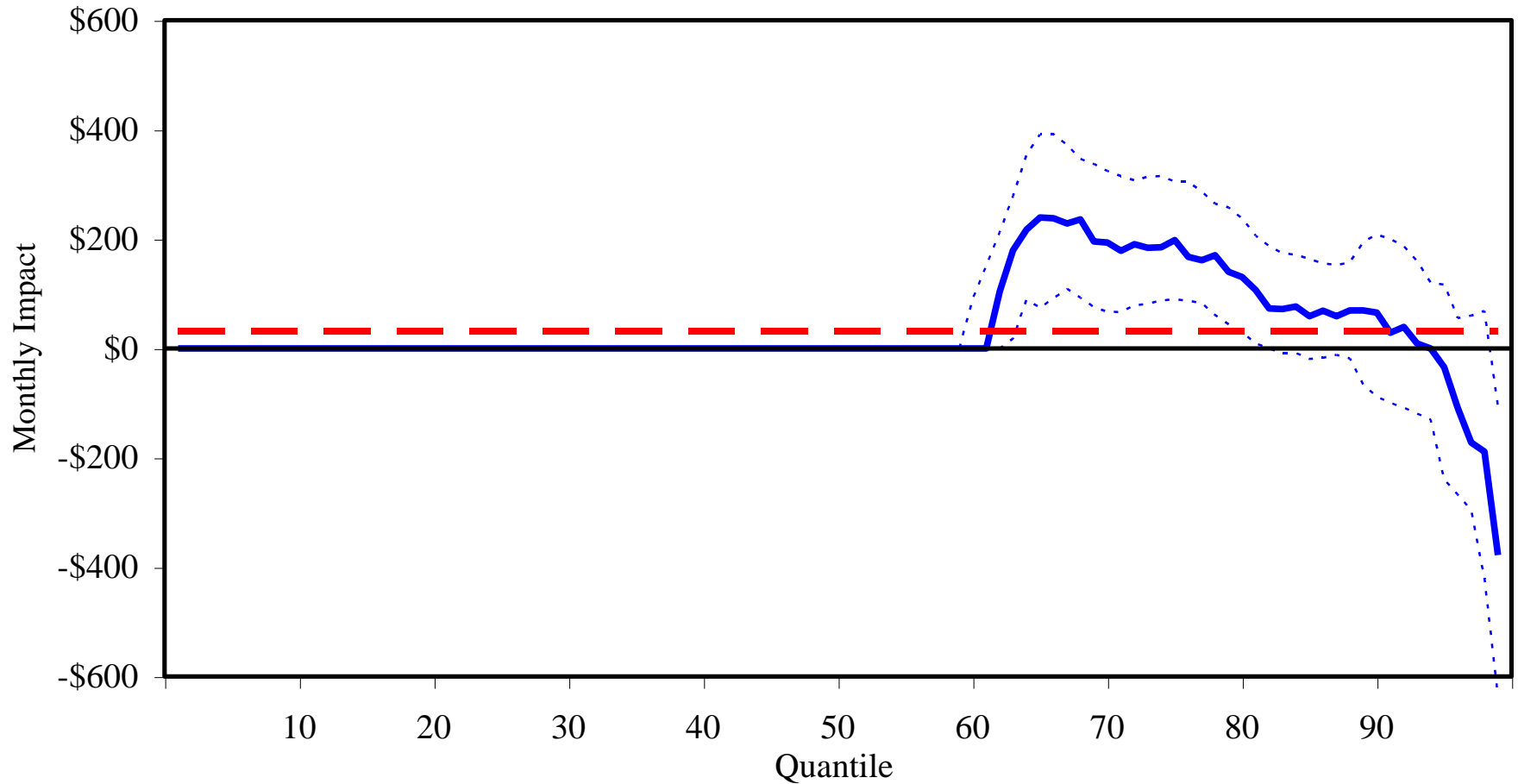
Common way to look for treatment effect heterogeneity is to look at means within subgroups.

Here we show that QTE exist even within education groups.

In general, intragroup variation is larger than intergroup variation

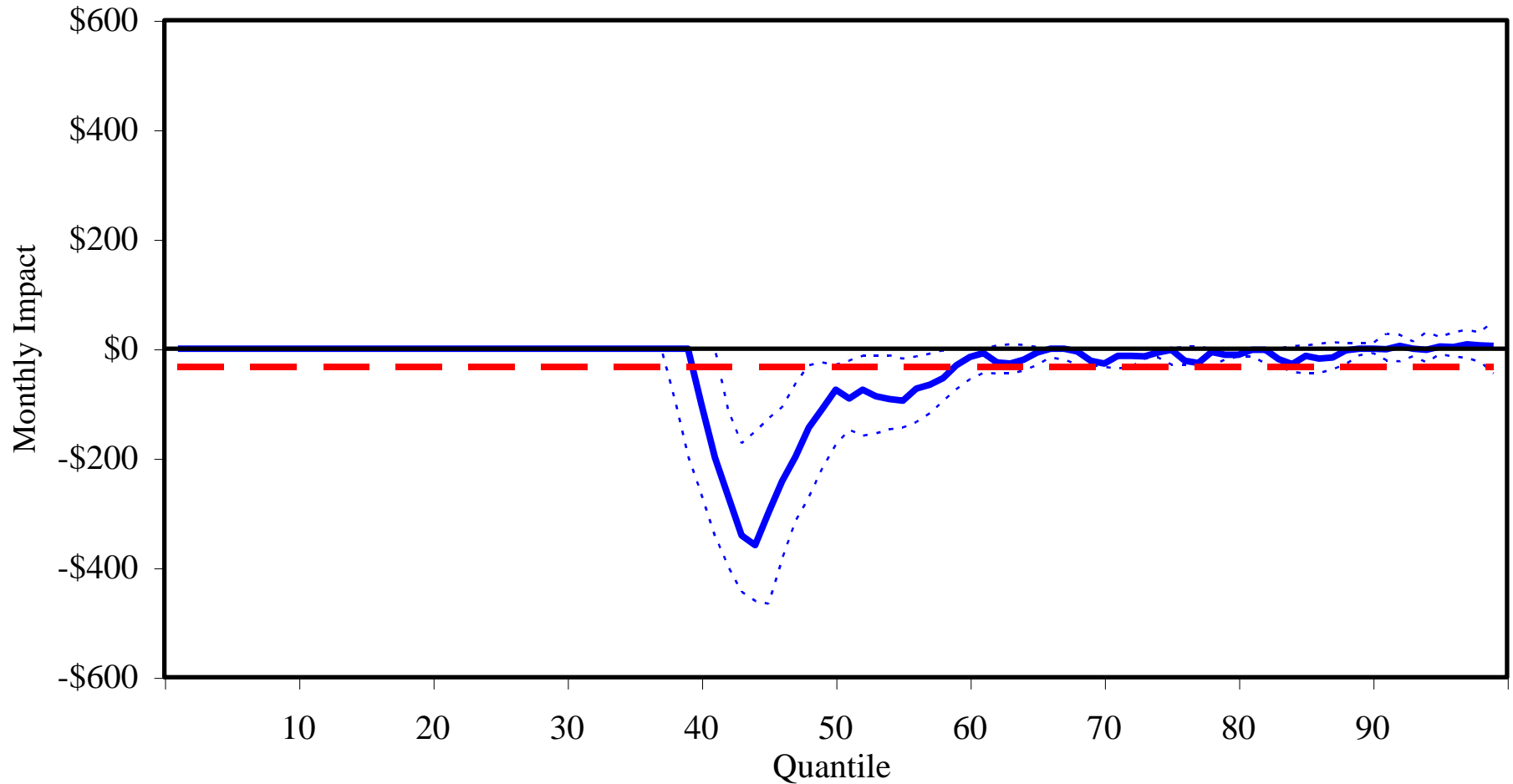
- QTEs after SSP receipt period ends; months 49-54

Figure 6: SSP Quantile Treatment Effects on Distribution of Monthly Earnings, Months 49-54



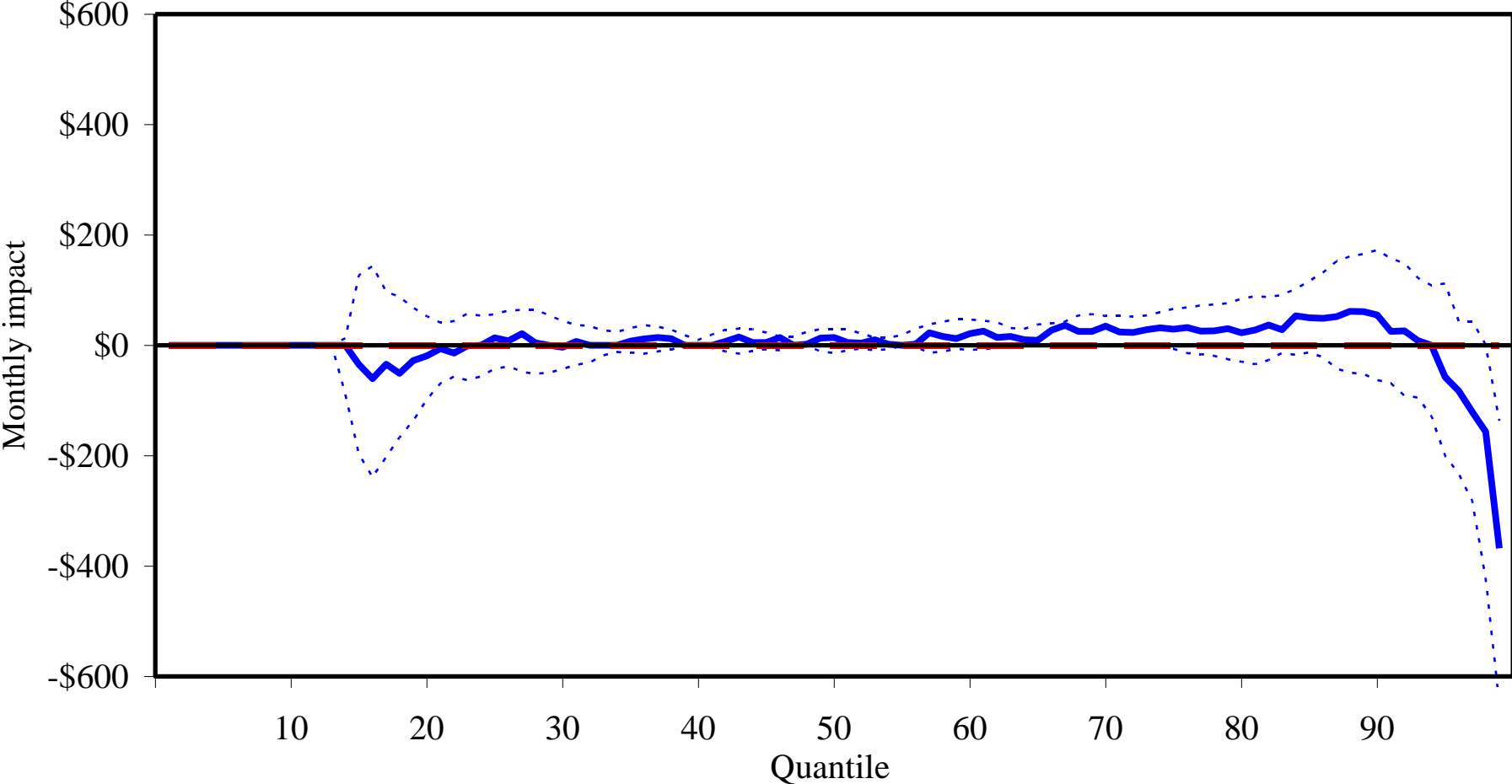
- Post-SSP period shows much smaller effects; same basic pattern

Figure 8: SSP Quantile Treatment Effects on Distribution of Transfers (IA + SSP)
Months 49-54



- All nonpositive. Negative impacts in middle of the distribution are consistent with positive earnings effects that persist after the end of the SSP period.

Figure 10: SSP Quantile Treatment Effects on the Distribution of Total Income
Months 49-54

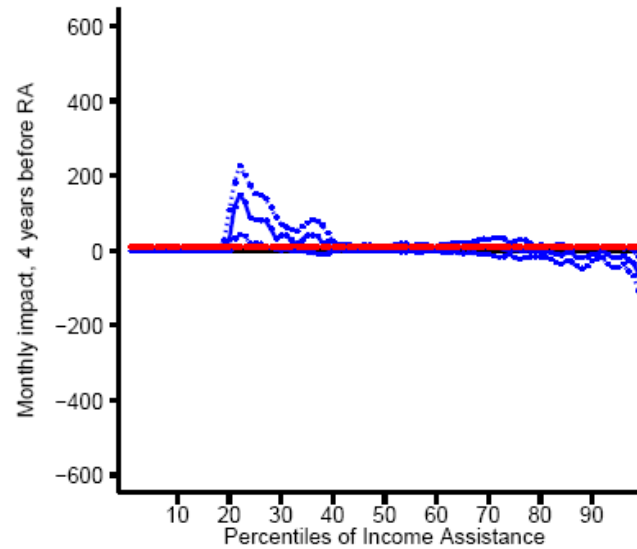
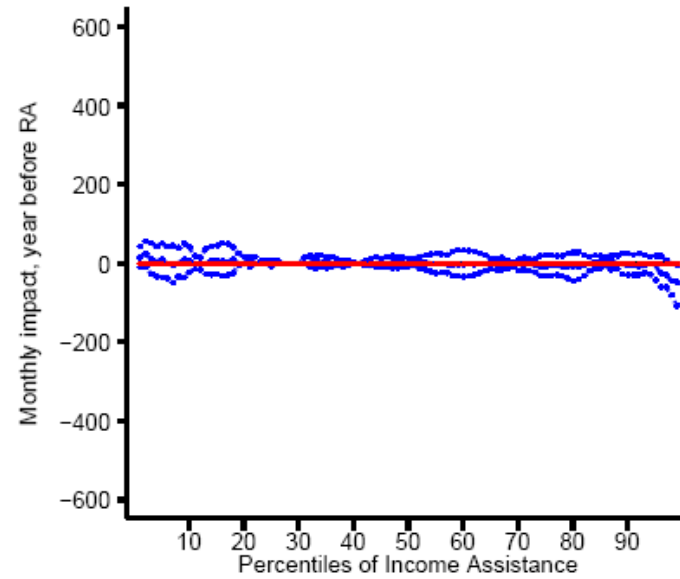
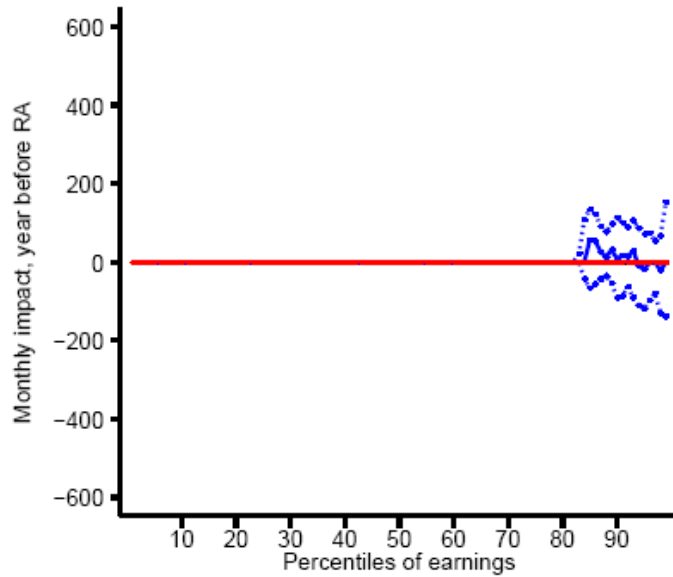


- Homogenous, zero impact of SSP on total income after SSP period ends.

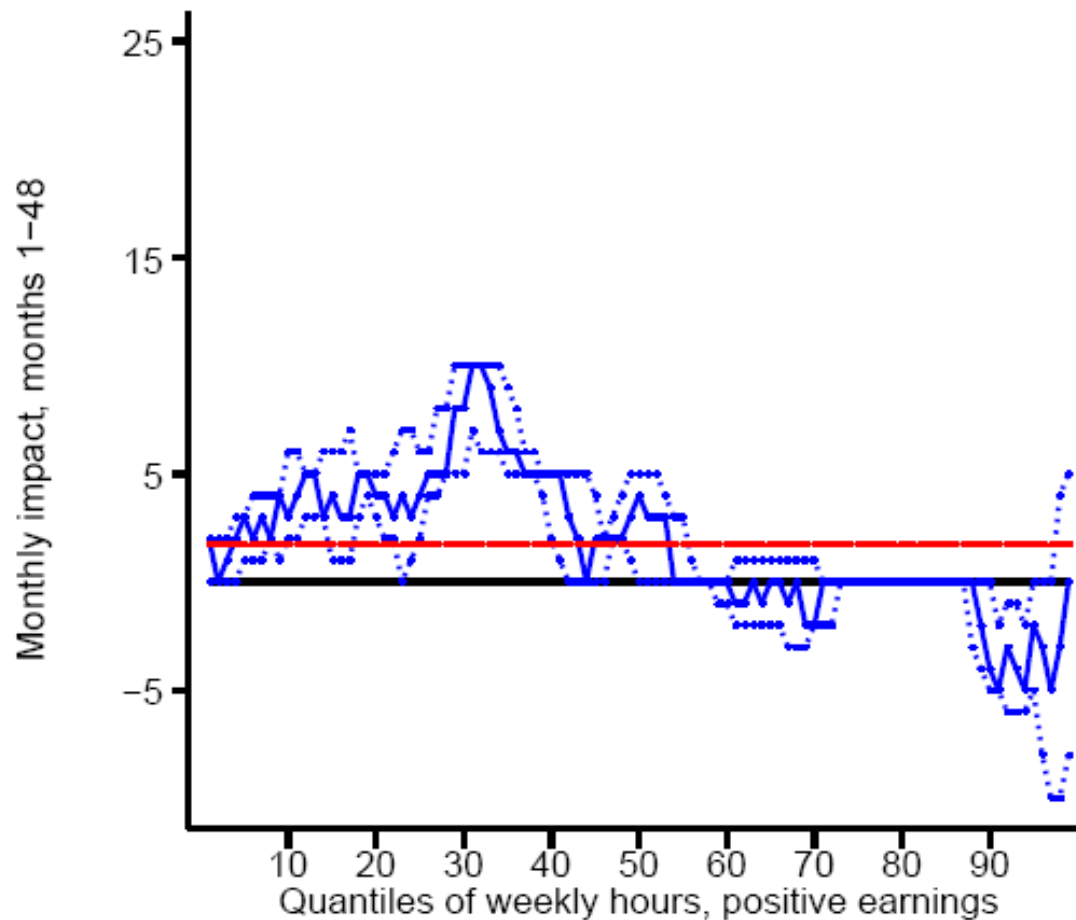
Conclusions

- Substantial evidence of heterogeneous impacts of SSP on earnings, transfers and income
- Nature of heterogeneity is consistent with labor supply theory
 - Evidence of changes in hours worked AND wages
- These results are important and could not be revealed with mean impacts (even within demographic subgroups)
- Generous earnings subsidies can increase earnings but not necessarily for higher earners; subsidies can increase income but those increases are concentrated at the top of the income distribution
- We are now working on a new paper where we decompose the impacts into extensive and intensive margin impacts

QTEs on pre-random assignment period

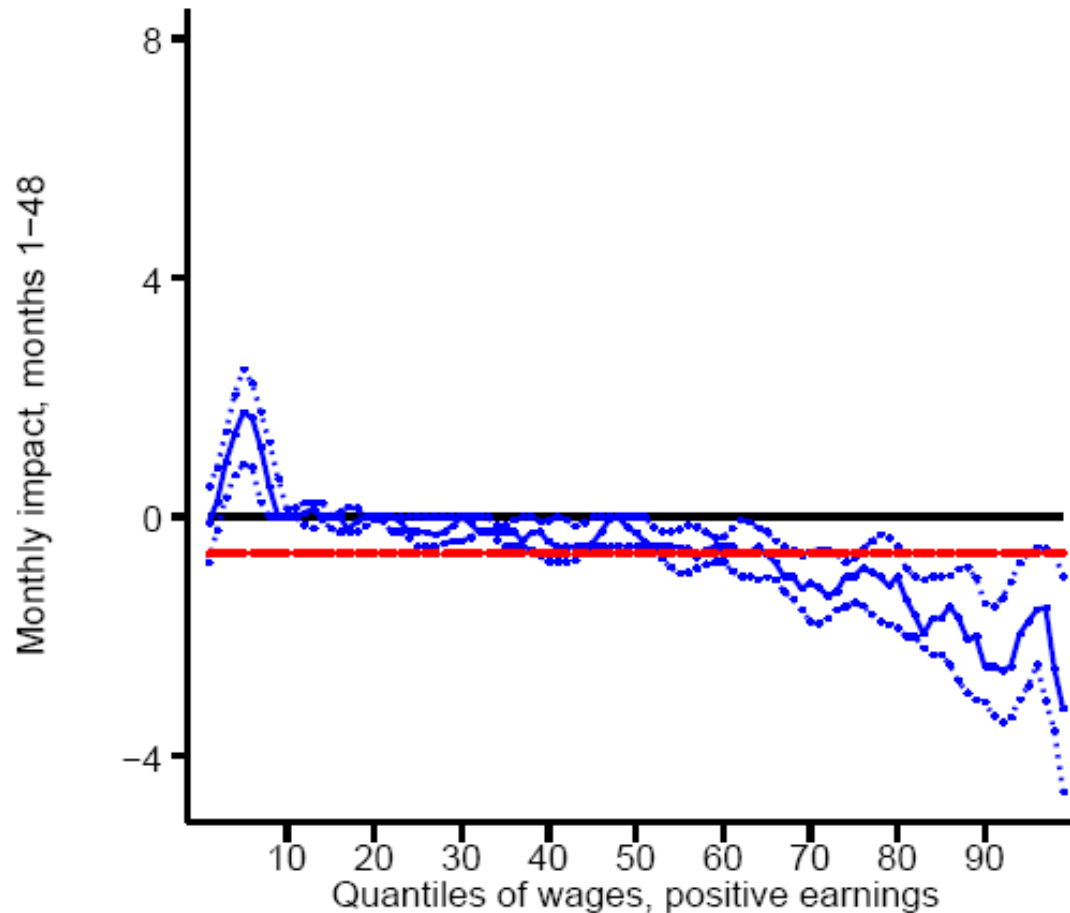


SSP Quantile Treatment Effects on Distribution of Usual Hours Worked Months 1-48, Conditional on Working Sample



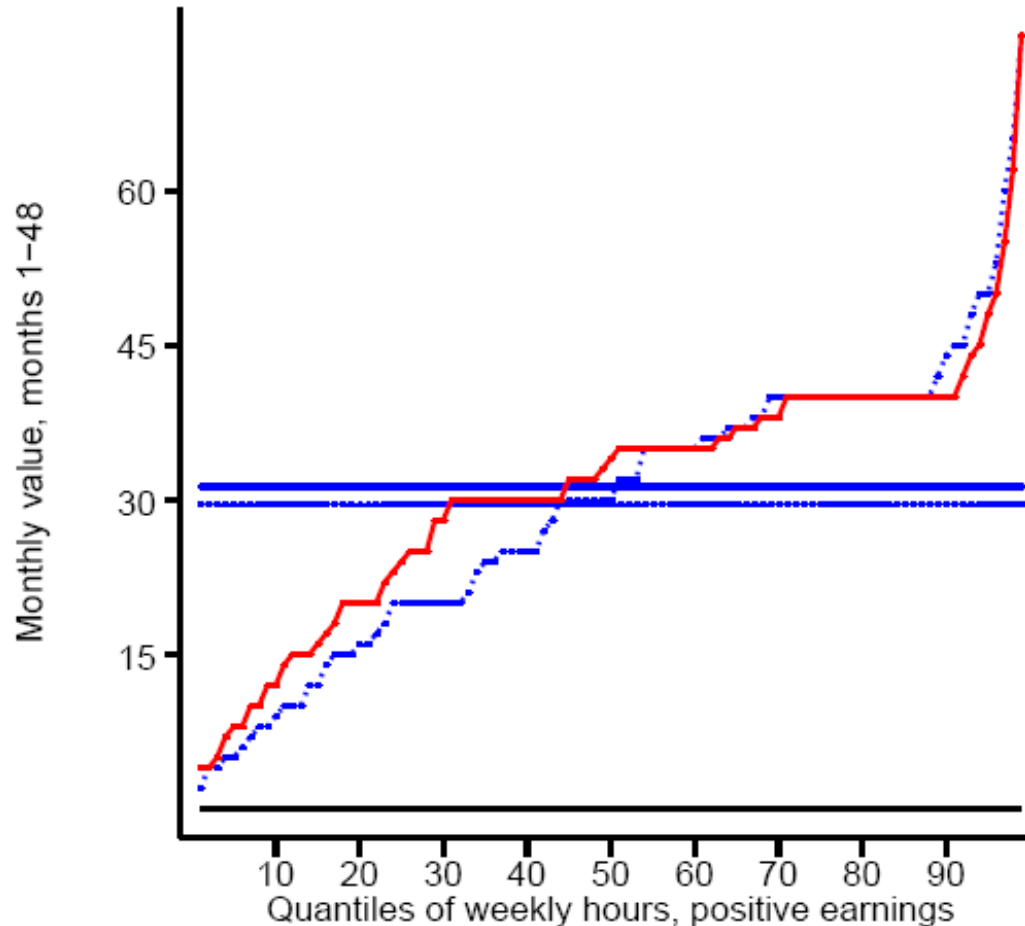
Solid line is QTEs, dotted lines are 90% CIs, dashed line is mean treatment effect.

SSP Quantile Treatment Effects on Distribution of Average Monthly Wage Months 1-48, Conditional on Working Sample



Solid line is QTEs, dotted lines are 90% CIs, dashed line is mean treatment effect.

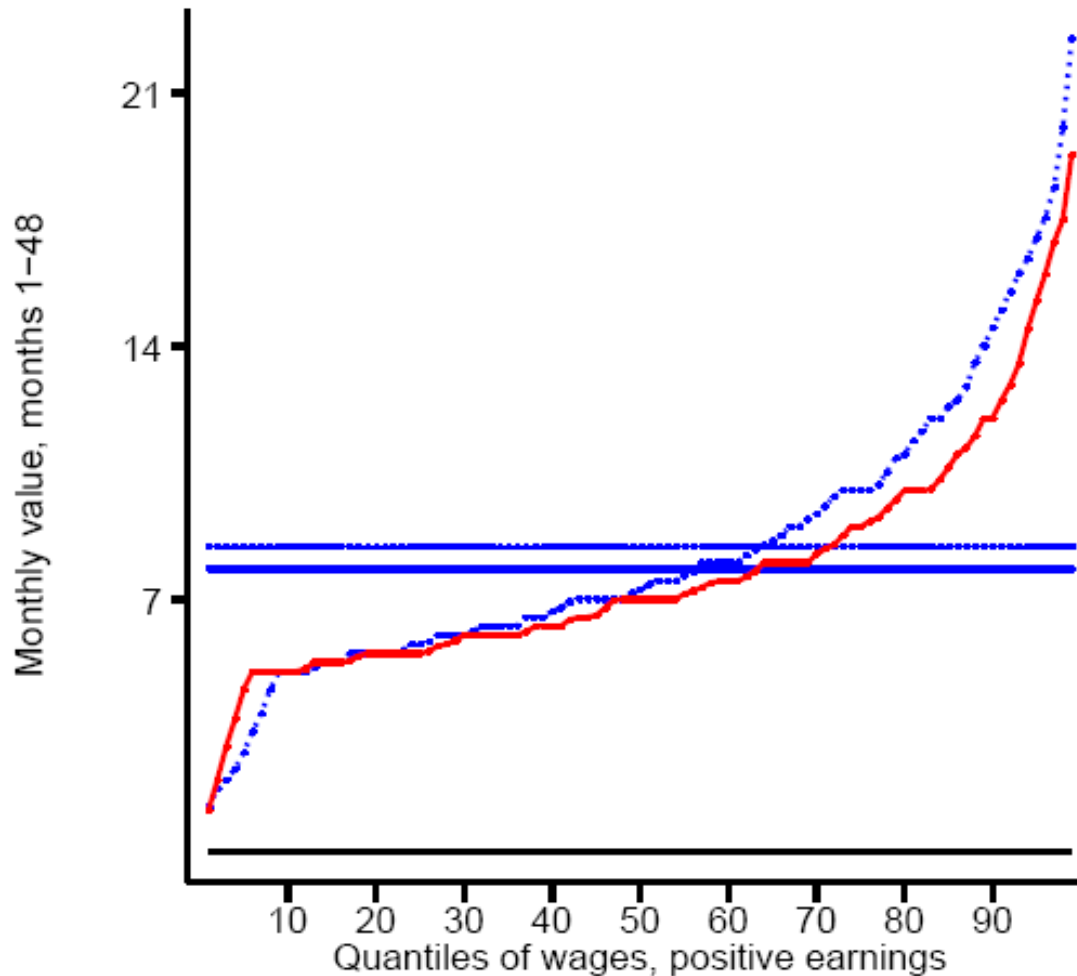
Distribution of Usual Hours Worked Months 1-48, Conditional on Working Sample



Solid lines are treatment group, dotted lines are control group.

SSP=red line, IA-only=blue line

Distribution of Average Monthly Wage Months 1-48, Conditional on Working Sample



Solid lines are treatment group, dotted lines are control group.

SSP=red line, IA-only=blue line