Bounding the Labor Supply Responses to a Randomized Welfare Experiment: A Revealed Preference Approach

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Motivation

- Optimal design of assistance policies depends on magnitude of extensive (work/not work) and intensive (how much to earn conditional on working) margin responsiveness (Diamond, 1980; Saez, 2002; Laroque, 2005)

- Conventional wisdom: most adjustment occurs on extensive margin. But.... how exactly do we know size of intensive margin responses?
  - Mean effects (e.g. Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001).
  - Bunching at kink points (e.g. Saez, 2010).

- However:
  - Mean effects not enough since most policies (e.g. EITC, TANF) incentivize some agents to work more and some to work less (Bitler, Gelbach, and Hoynes, 2006)
  - Issues in interpretation of excess mass at kinks if agents lack fine control (Chetty et al., 2011)

- Need to infer distribution of responses to policy. A nontrivial task, even with experimental data (Heckman, Smith, and Clements, 1997)

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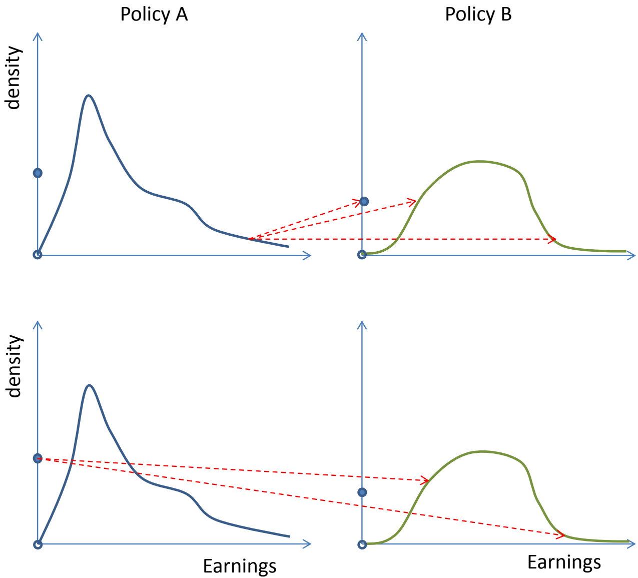
A Hypothetical Reform



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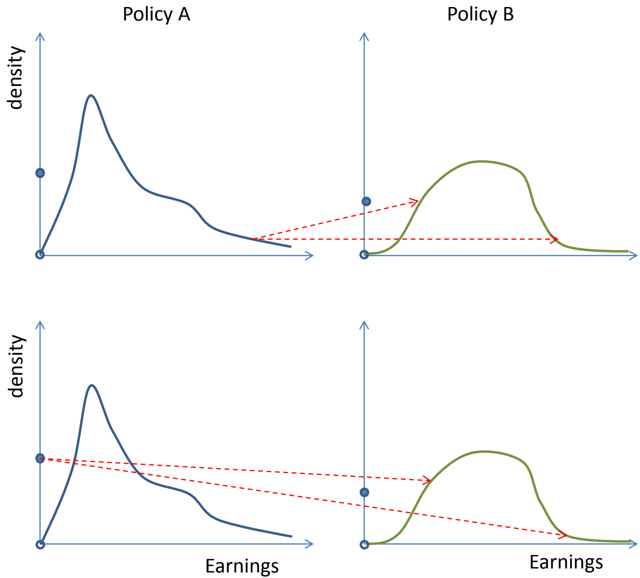


Jobs First and BGH (2006)

- Study experimental data from Connecticut's Jobs First (JF) program which provided strong work incentives but generated a large eligibility "notch" in budget set at federal poverty line.
    - Notch generated strong incentives to lower earnings in order to "opt-in" to welfare (Ashenfelter, 1983)
- Bitler, Gelbach, and Hoynes (BGH, 2006) provide nonparametric evidence suggestive of intensive margin response to welfare reform. They find that welfare reform:
    - yielded a mean earnings effect near zero
    - boosted the middle quantiles of earnings *and lowered* the top quantiles

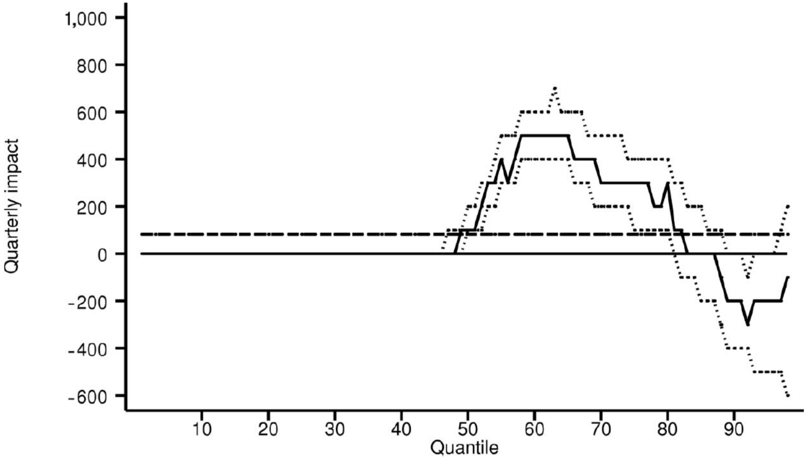


FIGURE 3. QUANTILE TREATMENT EFFECTS ON THE DISTRIBUTION OF EARNINGS, QUARTERS 1–7

Notes: Solid line is QTE; dotted lines provide bootstrapped 90-percent confidence intervals; dashed line is mean impact; all statistics computed using inverse propensity-score weighting. See text for more details.

This paper

- Exploit revealed preference restrictions to formally estimate frequency of intensive and extensive margin responses to Jobs First (JF) experiment
- Build non-parametric model of labor supply and program participation
  - Allow: unrestricted heterogeneity / labor supply constraints / under-reporting decisions
  - Derive allowable responses to reform via RP arguments ala Manski (2014)
- Exploit restrictions to derive bounds on probabilities of responding along various margins
- Results:
  - Substantial intensive and extensive margin responses to JF reform
  - Important under-reporting responses

Jobs First: Genesis and Experimental Design

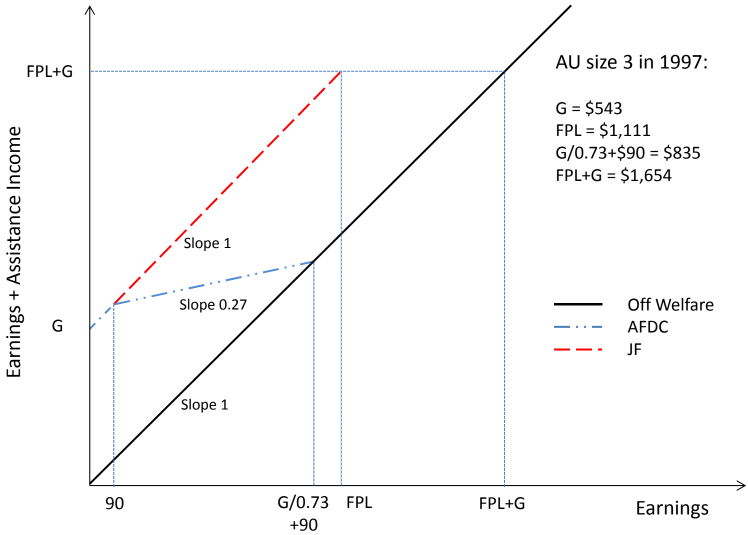
- In 1996, U.S. states required to replace AFDC (Aid to Families with Dependent Children) with TANF (Temporary Assistance to Needy Families):
  - time limits
  - work requirements
  - improved financial incentives to work

- CT implemented its own version of TANF: the Jobs First (JF) program

- In January 1996 and February 1997, MDRC conducted a randomized evaluation of JF. A baseline sample of 4,800 single parents: 50% randomly assigned to JF rules and 50% to the old AFDC rules

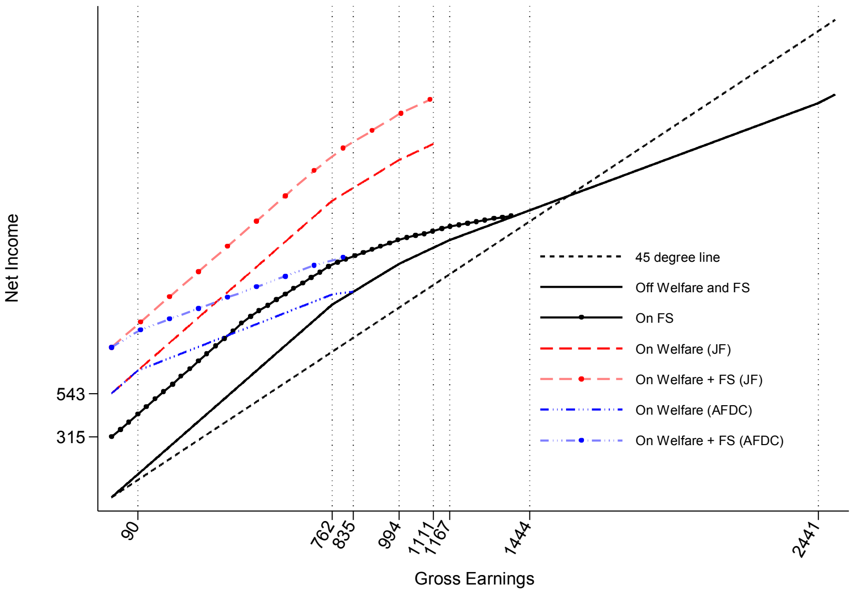
- Data: Baseline survey + administrative data on earnings and welfare participation before/after random assignment (RA)

Income vs Earnings for a Woman with 2 Children



Food Stamps, EITC, and Payroll Taxes

Figure 2: Net Income under Status Quo and Jobs First Policies, Accounting for Food Stamps and Taxes



Non-financial Incentives of JF

- Time limits:
  - Following BGH, restrict analysis to the first 7 Qs of the experiment: no woman is in danger of reaching the limit
  - BGH find no evidence of anticipatory behavior over this horizon
    - A test of our own along the lines of Grogger and Michaelopolous (2003) also fails to find anticipatory behavior Test
  - Bloom et al. (2002): Time limits not strictly enforced (women knew this)
    - Many families either exempt or granted an extension
- Work requirements and sanctions:
  - Mandatory job search program led to increased welfare "hassle"

Data

- MDRC's Jobs First Public Use Files.
- Baseline survey merged with administrative information on:
  - Welfare participation and payments,
  - Earnings covered by the UI system.
- Data limitations:
  - Monthly welfare payments are rounded (nearest $50).
  - Earnings are rounded (nearest $100) and only available quarterly.
  - The administrative measure of the AU size is missing for most cases.
  - The number of children at the time of RA (kidcount) is top-coded at 3.
    - Infer AU size from grant amount

Baseline Covariate Balance

Table 2: Mean Sample Characteristics

	Overall Sample			
	Jobs First	AFDC	Difference	Difference (adjusted)
Demographic Characteristics				
White	0.374	0.360	0.014	0.001
Black	0.380	0.384	-0.004	0.000
Hispanic	0.214	0.224	-0.010	-0.001
Never married	0.654	0.661	-0.007	0.000
Div/wid/sep/living apart	0.332	0.327	0.005	0.000
HS dropout	0.350	0.334	0.017	0.000
HS diploma/GED	0.583	0.604	-0.021	0.000
More than HS diploma	0.066	0.062	0.004	0.000
More than 2 Children	0.235	0.214	0.021	0.000
Mother younger than 25	0.287	0.298	-0.011	-0.003
Mother age 25-34	0.412	0.414	-0.003	0.005
Mother older than 34	0.301	0.287	0.014	-0.002
Average quarterly pretreatment values				
Earnings	673	750	-76*	4
	[1306]	[1379]	(40)	(6)
Cash welfare	903	845	58**	1
	[805]	[784]	(23)	(2)
Food stamps	356	344	12	0
	[320]	[304]	(9)	(1)
Fraction of pretreatment quarters with				
Any earnings	0.319	0.347	-0.029***	0.000
	[0.362]	[0.370]	(0.011)	(0.001)
Any cash welfare	0.581	0.551	0.030*	-0.001
	[0.451]	[0.450]	(0.013)	(0.001)
Any food stamps	0.613	0.605	0.008	0.000
	[0.437]	[0.431]	(0.012)	(0.001)
# of cases	2,318	2,324		

A Test for Intensive Margin Responsiveness

- If only effect of JF is to induce people to work, then program just shifts mass from zero to positive earnings levels.

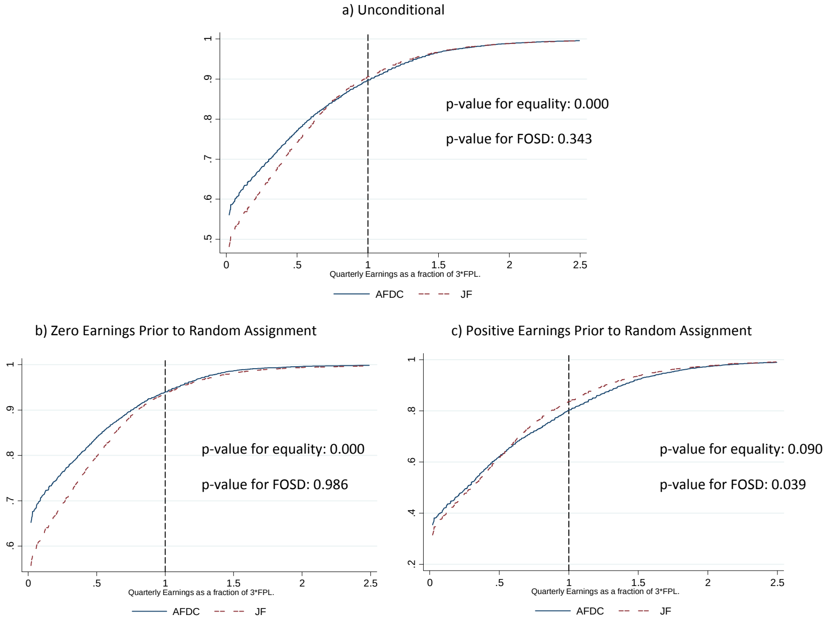
- Therefore earnings distribution of JF group should First Order Stochastically Dominate (FOSD) distribution of AFDC group.

- Test using variant of Barrett and Donald (2003) procedure.

- Split by earnings 7Q prior to RA since work disincentives strongest among women likely to earn high amounts under AFDC.
    - Expect FOSD violations among relatively high earning group.

Distributional Impacts

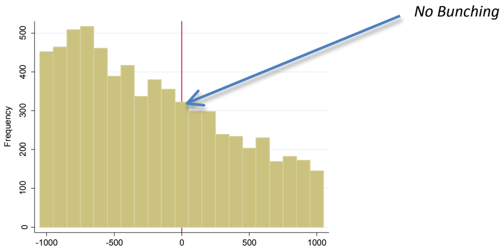
Figure 4: EDFs of Quarterly Earnings Relative to 3 x Federal Poverty Line



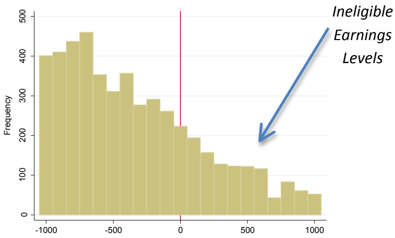
A Closer Look at the JF Earnings Distribution

Figure 3: Distribution of Quarterly Earnings Centered at 3 x Monthly Federal Poverty Line

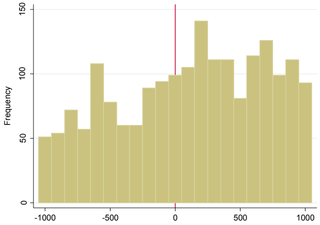
a) Unconditional



b) On Assistance all 3 Months of the Quarter



c) Off Assistance all 3 Months of the Quarter



Summary

- Rejection of FOSD $\Rightarrow$ intensive margin responses are present
  - But how frequent? And of what nature?

- Absence of mass point at notch problematic for many frictionless models with non-zero intensive margin elasticity (e.g., Saez, 2010; Kleven and Waseem, 2013)
  - Prudent to allow constraints on choice of earnings (Altonji and Paxson, 1988; Chetty et al., 2011; Dickens and Lundberg, 1993)

- Women with earnings above poverty line receiving assistance suggests under-reporting is prevalent
  - Direct evidence of under-reporting in JF final report (Bloom et al., 2002)
  - And in many related studies (Greenberg, Moffitt, and Friedman, 1981; Greenberg and Halsey, 1983; Hotz, Mullin, and Scholz, 2003)

A "Warmup" Model

- Conventional static utility maximization framework w/ no hours constraints
- Woman i has utility over hours (H) and a "consumption equivalent" (C) given by:

$$U_i\left(\overset{-}{H}, \overset{+}{C}\right)$$

- Assume fixed wage rate W_i, so that earnings are $E = W_i H$
- Policy rules summarized by $G_i^t(E)$ which gives transfer income under policy regime $t \in \{a, j\}$ (AFDC or JF).

Model (cont.)

- Let $D = 1$ if the woman participates in welfare and zero otherwise
- C is earnings + transfer income net of stigma (ϕ_i), hassle costs (η_i), and fixed costs of work (μ_i):

$$C = W_i H - \mu_i 1[H > 0] + D\left(G_i^t(W_i H) - \phi_i - \eta_i^t 1[H = 0]\right)$$

- JF has greater hassle ("work first")

$$\eta_i^j \geq \eta_i^a$$

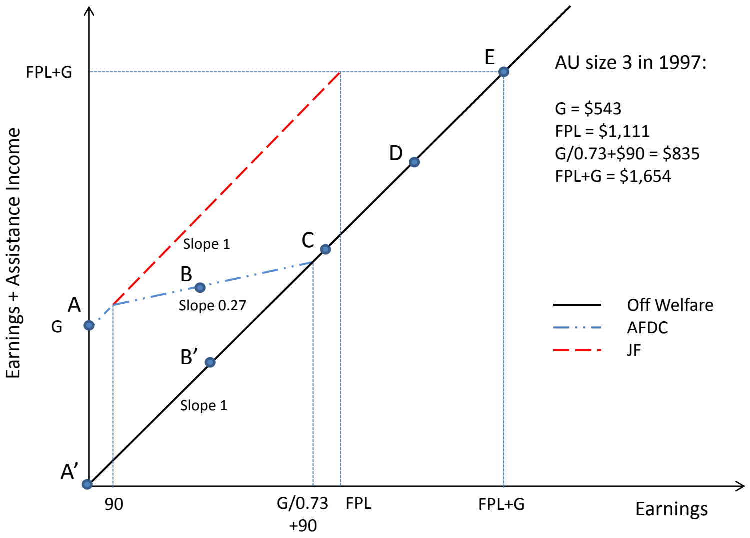
- Woman i's optimization problem:

$$\max_{H \geq 0, D \in \{0,1\}} U_i(H, C)$$

Model (cont.)

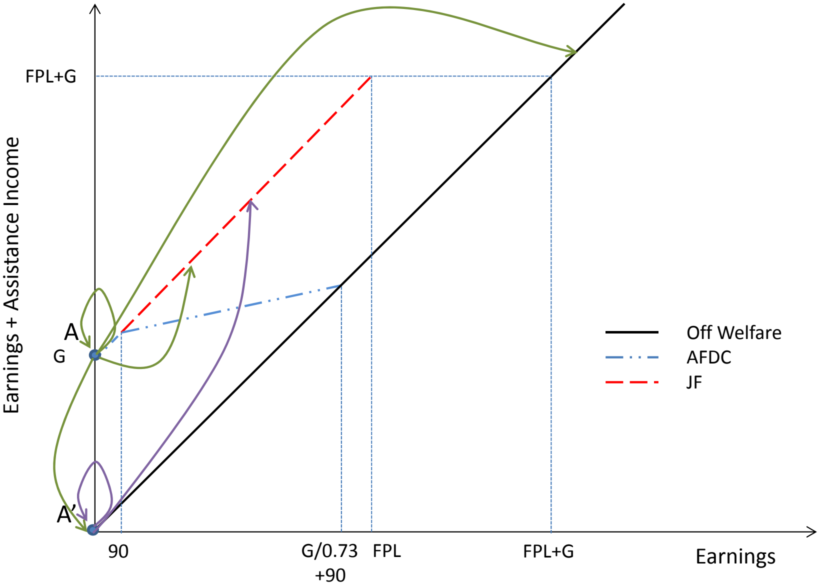
- Model constrains how woman i's choice under AFDC may be paired with choices under JF
- Restrictions follow from revealed preference arguments. The JF reform:
  - made working on welfare more attractive
  - potentially made not working on welfare less attractive
  - had no impact on the appeal of other choices (e.g. working off welfare)
- Since $U_i(.,.)$ invariant to the regime, woman i will not be induced to:
  - choose an option made less attractive by reform
  - abandon an option made more attractive by it
- Restrictions illustrated graphically by considering the choices she can make under JF given her choice under AFDC

A Budget Set

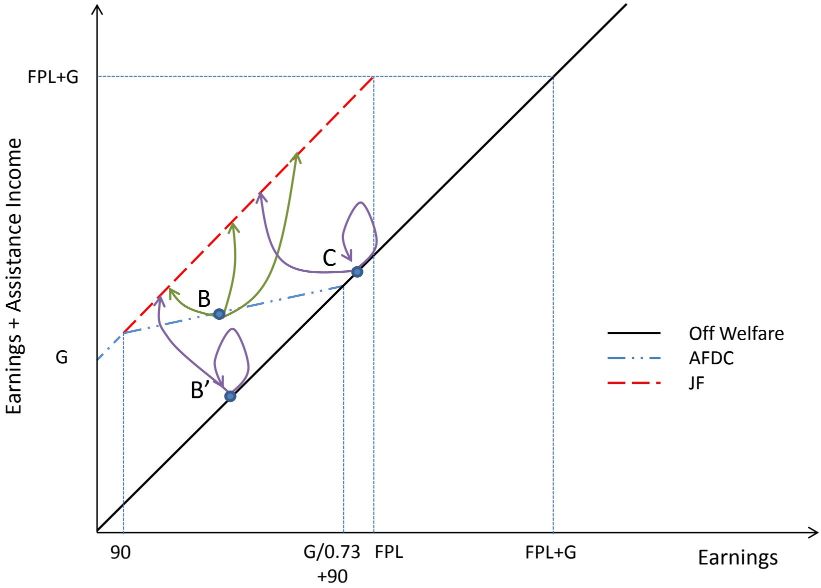


FPL+G
G
A
A'
B
B'
C
D
E
Slope 1
Slope 0.27
Slope 1
90
G/0.73
+90
FPL
FPL+G
Earnings
Earnings + Assistance Income
AU size 3 in 1997:
G = $543
FPL = $1,111
G/0.73+$90 = $835
FPL+G = $1,654
Off Welfare
AFDC
JF

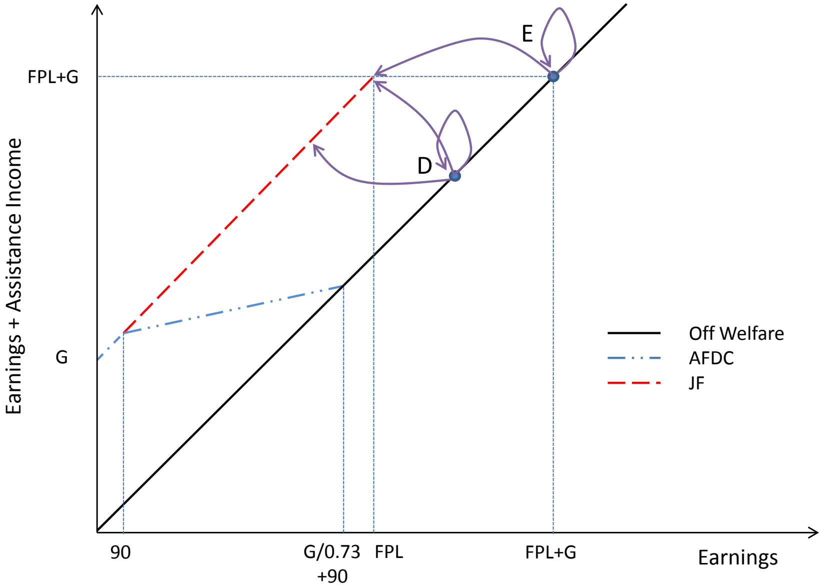
If she wouldn't work under AFDC



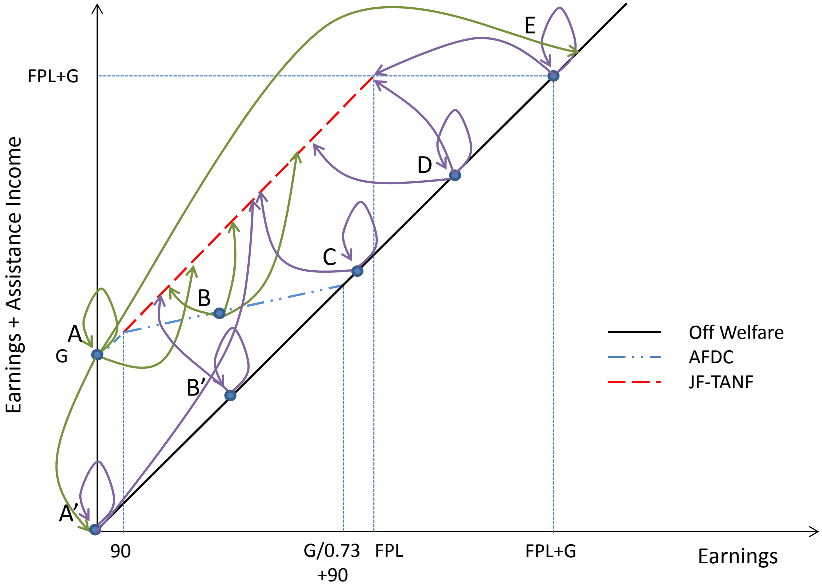
If she would work at low earnings levels



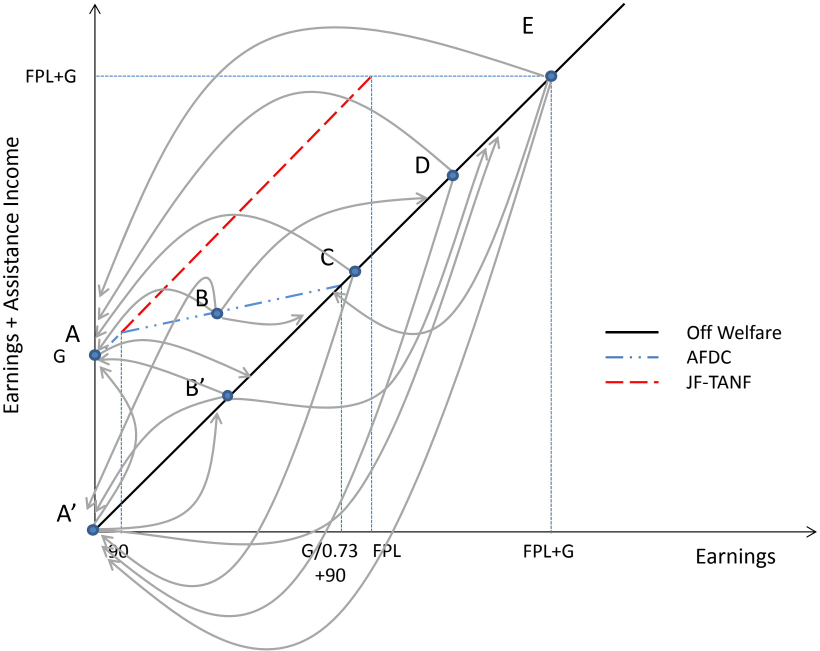
If she would work at high earnings levels



Allowed responses



Disallowed responses



Adding reporting decisions and constraints

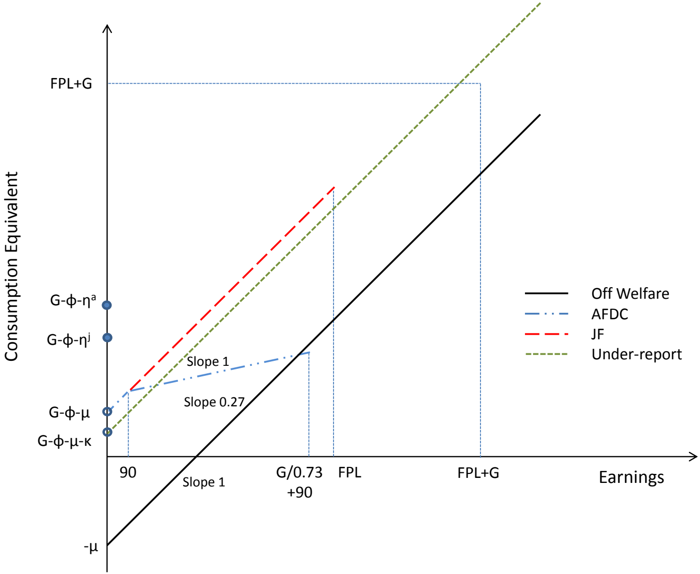
- Woman i draws a set of offers $\Theta_i \equiv \left\{\left(W_i^k, H_i^k\right)\right\}_{k=1}^{K_i}$.
  - Can choose an offer $(W, H) \in \Theta_i$ or not work $(0,0)$.
  - Nests unconstrained model as $K_i \to \infty$
- Transfer income is $G^t(E^r)$ where E^r is amont reported to welfare agency
  - Pay a cost κ_i when under-reporting
- Consumption equivalent becomes:

$$C = WH - \mu_i 1[H > 0] + D\left(G^t(E^r) - \phi_i - \eta_i^t 1[E^r = 0] - \kappa_i 1[E^r < WH]\right)$$

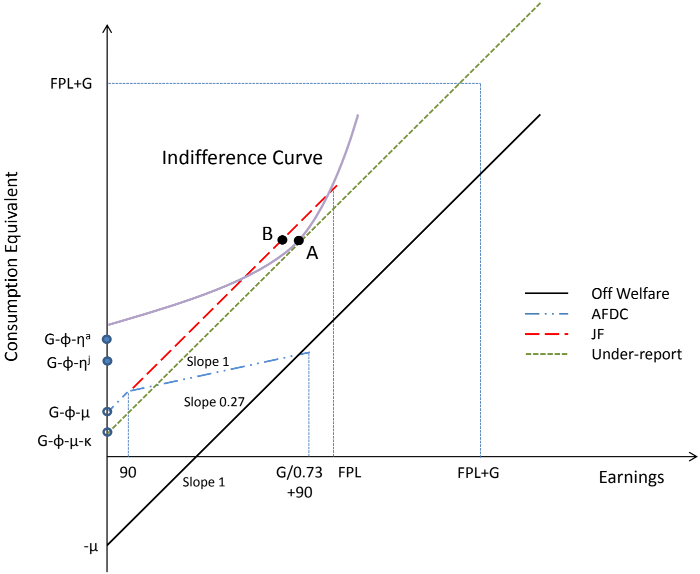
- Optimization problem is:

$$\max_{(W,H)\in\{\Theta_i,(0,0)\}, D\in\{0,1\}, E^r\in[0,WH]} U_i(H, C)$$

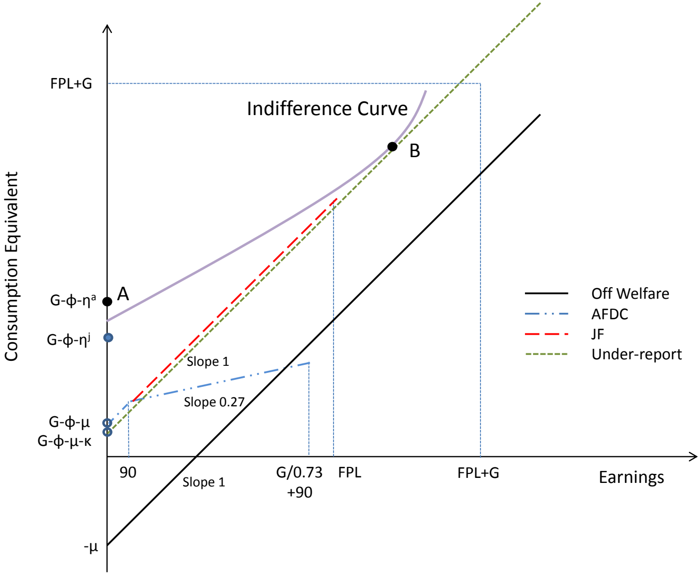
Budget w/ under-reporting options ($K_i = \infty$)



Truthful reporting response



Hassled into under-reporting



Fully non-parametric model

Dispense with consumption equivalent representation and define non-separable utility function:

$$U_i^t\left(H, C, D, Z, R\right),$$

where:

- $C = WH + DG_i^t\left(E^r\right)$ (earnings + transfers)
- $Z = D1\left[E^r = 0\right]$ (zero reported earnings indicator)
- $R = D1\left[E^r < E\right]$ (under-reporting indicator)

Optimization problem is:

$$\max_{(W,H)\in\{\Theta_i,(0,0)\},D\in\{0,1\},E^r\in[0,WH]} U_i^t\left(H, C, D, Z, R\right)$$

Non-parametric restrictions on utility

A.1 utility is strictly increasing in C

A.2 $U_i^t(H, C, 1, Z, 1) < U_i^t(H, C, 1, Z, 0)$ **(under-reporting is costly)**

A.3 $U_i^t(H, C, 1, 1, R) \leq U_i^t(H, C, 1, 0, R)$ **(hassle costs may exist)**

A.4 $U_i^j(H, C, 1, 1, R) \leq U_i^a(H, C, 1, 1, R)$ **(JF hassle $\geq$ AFDC hassle)**

A.5 $U_i^j(H, C, 1, 0, R) = U_i^a(H, C, 1, 0, R)$ **(regime-invariance #1)**

A.6 $U_i^j(H, C, 0, 0, 0) = U_i^a(H, C, 0, 0, 0)$ **(regime-invariance #2)**

A.5+A.6 imply:

- Under-reporting costs and "stigma" are regime-invariant
- Value of off-welfare alternatives are regime-invariant

Graphical example: quasi-linear utility

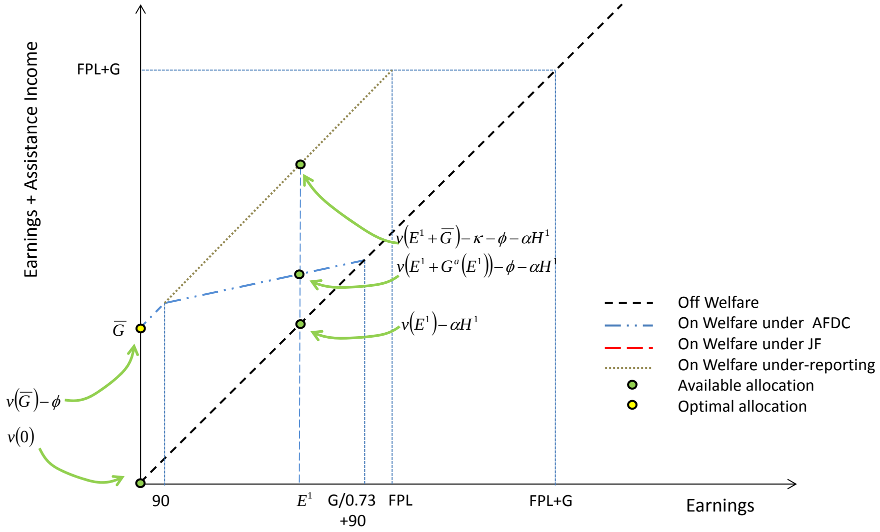
Useful to consider special case obeying **A.1-A.6**:

$$\begin{aligned} U_i^t (H, C, D, Z, R) &= v_i(C) - \alpha_i H \\ &\quad - D \left(\phi_i + \eta_i^t 1[E^r = 0] + \kappa_i 1[E^r < WH] \right) \end{aligned}$$

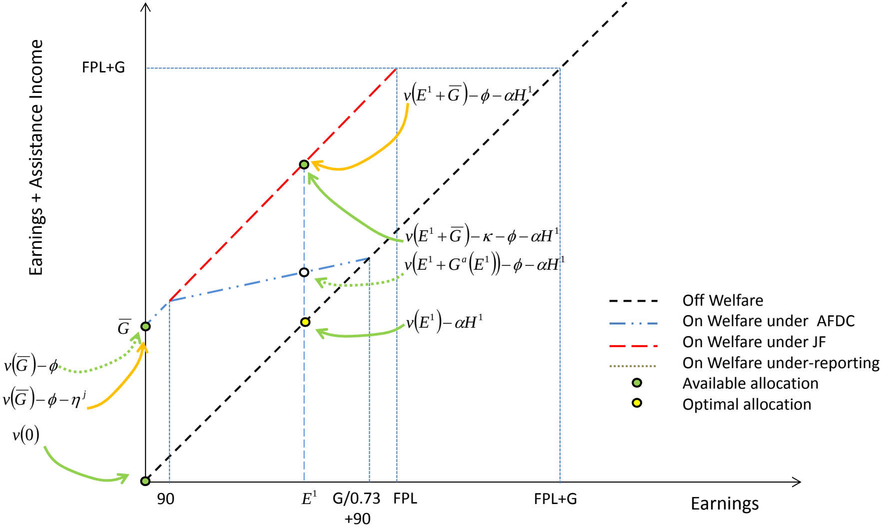
In what follows, suppose:

- $v_i(.)$ concave
- $\eta_i^j > \eta_i^a = 0$ (hassled only under JF)

Choices (and payoffs) under AFDC with one offer



Hassled off welfare into working below FPL



Empirical content

- Primitives governing choices:

$$\theta_i \equiv \left(U_i^j\left(.,.,.,.,.\right), U_i^a\left(.,.,.,.,.\right), \Theta_i, G_i^j\left(.\right), G_i^a\left(.\right) \right)$$

- Unrestricted heterogeneity across women: $\theta_i \sim \Gamma_\theta\left(.\right)$

- No cross-sectional predictions for a single policy regime (can rationalize anything w/ choice of $\Gamma_\theta\left(.\right)$)

- Only restrictions on pairing of responses across different regimes

- Consider implications of model for responses in terms of **coarse** earnings ranges + program participation categories
    - Model rules out pairings between (but not within) earnings categories
    - Analogous to budget "patches" of Kitamura and Stoye (2013)

Notation

- Earnings categories:

$$\widetilde{E} = \begin{cases} 0 & \text{if } E = 0 \\ 1 & \text{if } 0 < E \leq FPL \\ 2 & \text{if } E > FPL \end{cases}$$

- Earnings / Participation / Reporting *States*

$$\mathscr{S} \equiv \{0n, 1n, 2n, 0r, 1r, 1u, 2u\}$$

  - n - nonparticipation,
  - r - participation w/ truthful reporting,
  - u - participation w/ under-reporting

- $\left(S_i^a, S_i^j\right)$ denote woman i's *potential* states under AFDC/JF

Model restrictions

State under Jobs First

State under AFDC	0n	1n	2n	0r	1r	1u	2u
0n	No Response	—	—	—	Extensive LS (+) Take Up Welfare	—	—
1n	—	No Response	—	—	Intensive LS (+/0/-) Take Up Welfare	—	—
2n	—	—	No Response	—	Intensive LS (-) Take Up Welfare	—	—
0r	No LS Response Exit Welfare	Extensive LS (+) Exit Welfare	Extensive LS (+) Exit Welfare	No Response	Extensive LS (+)	—	Extensive LS (+) Under-reporting
1r	—	—	—	—	Intensive LS (+/0/-)	—	—
1u	—	—	—	—	Intensive LS (+/0/-) Truthful Reporting	—	—
2u	—	—	—	—	Intensive LS (-) Truthful Reporting	—	No Response

Response probabilities

- Joint Probability:

$$\Pr\left(S_i^j = s^j, S_i^a = s^a\right) = \Pr\left(S_i^j = s^j | S_i^a = s^a\right) \Pr\left(S_i^a = s^a\right).$$

- Sum over s^a:

$$\Pr\left(S_i^j = s^j\right) = \sum_{s^a \in \mathscr{S}} \Pr\left(S_i^j = s^j | S_i^a = s^a\right) \Pr\left(S_i^a = s^a\right).$$

- In matrix notation:

$$\mathbf{p}^j = \Pi' \mathbf{p}^a.$$

- Observe:
  - $\mathbf{p}^j$ and $\mathbf{p}^a$ are 7×1 vectors, identified by random assignment
  - Π contains 7×6 unknown **response probabilities** denoted π_{s^a, s^j}.

Response Probabilities

State under	Earnings / Reporting State under JF						
AFDC	$0n$	$1n$	$2n$	$0r$	$1r$	$1u$	$2u$
$0n$	$1-\pi_{0n,1r}$	0	0	0	$\pi_{0n,1r}$	0	0
$1n$	0	$1-\pi_{1n,1r}$	0	0	$\pi_{1n,1r}$	0	0
$2n$	0	0	$1-\pi_{2n,1r}$	0	$\pi_{2n,1r}$	0	0
$0r$	$\pi_{0r,0n}$	$\pi_{0r,1n}$	$\pi_{0r,2n}$	$1-\pi_{0r,0n}-\pi_{0r,2n}$ $-\pi_{0r,1r}-\pi_{0r,2u}-\pi_{0r,1n}$	$\pi_{0r,1r}$	0	$\pi_{0r,2u}$
$1r$	0	0	0	0	1	0	0
$1u$	0	0	0	0	1	0	0
$2u$	0	0	0	0	$\pi_{2u,1r}$	0	$1-\pi_{2u,1r}$

Integrate out unobserved states

State under	Earnings / Reporting State under JF					
AFDC	$0n$	$1n$	$2n$	$0p$	$1p$	$2p$
$0n$	$1-\pi_{0n,1r}$	0	0	0	$\pi_{0n,1r}$	0
$1n$	0	$1-\pi_{1n,1r}$	0	0	$\pi_{1n,1r}$	0
$2n$	0	0	$1-\pi_{2n,1r}$	0	$\pi_{2n,1r}$	0
$0p$	$\pi_{0r,0n}$	$\pi_{0r,1n}$	$\pi_{0r,2n}$	$1-\pi_{0r,0n}-\pi_{0r,2n}$ $-\pi_{0r,1r}-\pi_{0r,2u}-\pi_{0r,1n}$	$\pi_{0r,1r}$	$\pi_{0r,2u}$
$1p$	0	0	0	0	1	0
$2p$	0	0	0	0	$\pi_{2u,1r}$	$1-\pi_{2u,1r}$

Identification

- A system of 5 (non-redundant) eq.s in 9 unknown π's:

$$
\begin{aligned}
p^j_{0n} - p^a_{0n} &= -p^a_{0n}\pi_{0n,1r} + p^a_{0p}\pi_{0r,0n} \\
p^j_{1n} - p^a_{1n} &= -p^a_{1n}\pi_{1n,1r} + p^a_{0p}\pi_{0r,1n} \\
p^j_{2n} - p^a_{2n} &= -p^a_{2n}\pi_{2n,1r} + p^a_{0p}\pi_{0r,2n} \\
p^j_{0p} - p^a_{0p} &= -p^a_{0p}\left(\pi_{0r,1n} + \pi_{0r,1r} + \pi_{0r,2u} + \pi_{0r,2n} + \pi_{0r,0n}\right) \\
p^j_{2p} - p^a_{2p} &= p^a_{0p}\pi_{0r,2u} - p^a_{2p}\pi_{2u,1r}
\end{aligned}
$$

- Left hand side gives effects on distribution (net flows) rhs provides rationalization in distribution of effects (gross flows)

- Over-(partial)-identified: system implies 16 refutable inequality restrictions (listed in paper)
  - Example: $p^j_{0p} - p^a_{0p} \leq 0$ (JF lowers fraction of women on welfare and not-working)

Bounds on response probabilities

- Bounds on 9 unknown π's solve a linear programming problem.
- Find analytical solutions via enumeration. Example:

$$\max\left\{0, \frac{p^a_{2n}-p^j_{2n}}{p^a_{2n}}\right\} \le \pi_{2n,1r} \le \min\left\{\begin{array}{c} 1, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{0n}-p^j_{0n}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{2p}-p^j_{2p}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{1n}-p^j_{1n}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{0n}-p^j_{0n}\right)+\left(p^a_{2p}-p^j_{2p}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{0n}-p^j_{0n}\right)+\left(p^a_{1n}-p^j_{1n}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{2p}-p^j_{2p}\right)+\left(p^a_{1n}-p^j_{1n}\right)}{p^a_{2n}}, \\ \frac{\left(p^a_{2n}-p^j_{2n}\right)+\left(p^a_{0p}-p^j_{0p}\right)+\left(p^a_{0n}-p^j_{0n}\right)+\left(p^a_{2p}-p^j_{2p}\right)+\left(p^a_{1n}-p^j_{1n}\right)}{p^a_{2n}} \end{array}\right\}$$

Estimation and Inference

- Estimate bounds by evaluating $\max\{.\}$ and $\min\{.\}$ using sample $\hat{p}$.

- Two approaches to inference

  1. "Naive" approach – treat identity of binding constraint as known. Can then apply results of Imbens and Manski (2002).

  2. "Conservative" inference – treat all constraints as binding. Degenerate version of intersection bounds approach of Chernozhukov, Lee, and Rosen (2013).

Table 4: Probability of Earnings / Participation States

	Overall			Overall - Adjusted		
	Jobs First	AFDC	Difference	Jobs First	AFDC	Difference
Pr(State=0n)	0.127	0.136	-0.009	0.128	0.135	**-0.007**
				(0.006)	(0.006)	**(0.008)**
Pr(State=1n)	0.076	0.130	-0.055	0.078	0.126	**-0.048**
				(0.004)	(0.005)	**(0.006)**
Pr(State=2n)	0.068	0.099	-0.031	0.069	0.096	**-0.027**
				(0.004)	(0.005)	**(0.006)**
Pr(State=0p)	0.366	0.440	-0.074	0.359	0.449	**-0.090**
				(0.008)	(0.008)	**(0.012)**
Pr(State=1p)	0.342	0.185	0.157	0.343	0.184	**0.159**
				(0.008)	(0.006)	**(0.009)**
Pr(State=2p)	0.022	0.009	0.013	0.023	0.009	**0.014**
				(0.002)	(0.001)	**(0.002)**
# of quarterly observations	16,226	16,268		16,226	16,268	

Notes: Sample covers quarters 1-7 post-random assignment during which individual is either always on or always off welfare. Sample units with kidcount missing are excluded. Number of state refers to earnings level, with 0 indicating no earnings, 1 indicating earnings below 3 times the monthly FPL, and 2 indicating earnings above 3FPL. The letter n indicates welfare nonparticipation throughout the quarter while the letter p indicates welfare participation throughout the quarter. Poverty line computed under assumption AU size is one greater than amount implied by baseline kidcount variable. Adjusted probabilities are adjusted via the propensity score reweighting algorithm described in the Appendix. Standard errors computed using 1,000 block bootstrap replications (resampling at case level).

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Table 5: Point and Set-identified Response Probabilities

Response Type	State Occupied under *AFDC*	*JF*	Symbol	Estimate	S.E.	95% CI (naive)	95% CI (conservative)
			(a) General Specification of Preferences				
Detailed	0n	1r	$\pi_{0n,1r}$	{0.055, 0.620}		[0.000, 0.758]	[0.000, 0.879]
	1n	1r	$\pi_{1n,1r}$	{0.382, 0.987}		[0.320, 1.000]	[0.320, 1.000]
	2n	1r	$\pi_{2n,1r}$	{0.280, 1.000}		[0.193, 1.000]	[0.193, 1.000]
	0r	0n	$\pi_{0r,0n}$	{0.000, 0.170}		[0.000, 0.211]	[0.000, 0.247]
	"	1n	$\pi_{0r,1n}$	{0.000, 0.170}		[0.000, 0.211]	[0.000, 0.251]
	"	2n	$\pi_{0r,2n}$	{0.000, 0.154}		[0.000, 0.171]	[0.000, 0.304]
	"	1r	$\pi_{0r,1r}$	{0.000, 0.170}		[0.000, 0.211]	[0.000, 0.251]
	"	2u	$\pi_{0r,2u}$	{0.031, 0.051}		[0.022, 0.058]	[0.022, 0.131]
	2u	1r	$\pi_{2u,1r}$	{0.000, 1.000}		[0.000, 1.000]	[0.000, 1.000]
Composite	Not working	Working	$\pi_{0,1+}$	0.167	0.020	[0.129, 0.206]	[0.129, 0.206]
	Off welfare	On welfare	$\pi_{n,p}$	{0.231, 0.445}		[0.187, 0.487]	[0.187, 0.510]
	On welfare	Off welfare	$\pi_{p,n}$	{0.000, 0.119}		[0.000, 0.148]	[0.000, 0.174]
	On welfare, not working	Off welfare	$\pi_{0r,n}$	{0.000, 0.170}		[0.000, 0.211]	[0.000, 0.245]
			(b) Restricted Specification of Preferences				
Detailed	0r	1n	$\pi_{0r,1n}$	0			
	1n	1r	$\pi_{1n,1r}$	0.382	0.038	[0.308, 0.456]	[0.308, 0.456]

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Extension: Splitting the top earnings range

- Are the intensive margin earnings reductions associated with opt-in small?
- Split the top earnings range:

$$\widetilde{E}_i \equiv \begin{cases} 0 & \text{if } E = 0 \\ 1 & \text{if } E \leq FPL_i \\ 2' & \text{if } E \in (FPL_i, 1.2 \times FPL_i] \\ 2'' & \text{if } E > 1.2 \times FPL_i \end{cases}$$

- RP implies reform won't lead to switches between $2'$ and $2''$
- Lower limits of 95% CIs on detailed opt-in probabilities:
  - $\pi_{2n'',1r} \geq .17$
  - $\pi_{2n',1r} \geq .19$
- Bottom line: some opt-in responses involved substantial earnings reductions

Conclusion

- Substantial intensive and extensive margin responses to JF reform
  - Consistent w/ BGH interpretation and other recent evidence (Blundell, Bozio, and Laroque, 2012)
  - Artifact of JF notch as opposed to usual kink?
- Under-reporting behavior important for rationalizing impacts (JF increased prevalence of state $2p$)
  - Interaction between work requirements and fixed costs of work.
- Limitations of bunching approach: no bunching, but big impact.

Future work

- Revealed preference approach easily extended to quasi-experimental settings (e.g. EITC expansion, health care reform)
- Extrapolating responses to new regimes:
  - Nonparametric approach requires lots of policy variation
  - Further restrictions on model primitives
    - Back to (semi-) parametric modeling?
- Dynamic Models
- "Behavioral" models / Violations of revealed preference?

The Jobs First Reform

Table 1: Summary of Differences Between Status Quo and Jobs First Policy Regimes

	Jobs First	Status Quo
Welfare:		
Name of Program	Temporary Family Assistance (TFA)	Aid for Families with Dependent Children (AFDC)
Eligibility	Earnings below poverty line	Earnings level at which benefits are exhausted
Earnings disregards:		
Fixed diregard	n.a	\$120 /mo. (first 12 months of work), \$90 /mo. (after)
Proportional disregard	100%	51% (first 4 months of work), 27% (after month 4)
Time Limit	21 months	None
Work requirements	Mandatory work first employment services (exempt if child <1)	Education / training (exempt if child < 2)
Other Features:		
Sanctions	3 month grant reduction due to infraction: 20% (1st), 35% (2nd), 100% (3rd); moderate enforcement	grant reduction corresponding to removal of adult from AU; rarely enforced
Asset Limit	\$3,000	\$1,000
Family Cap	\$50 /mo.	\$100 /mo.
Transitional Medicare	2 years	1 year
Transitional Child Care	As long as income is <75% of state median	1 year as long as income is <75% of state median
Child Support	\$100 /mo. disregarded; full pass-through	\$50 /mo. disregarded; \$50 /mo. maximum pass-through
Food Stamps (if joint with welfare):		
Earning Disregards:		
Proportional disregard	100% up to poverty line	76% up to the eligibility threshold

A Test for Anticipation

Table 6: Fraction of Months on Welfare by Experimental Status and Age of Youngest Child

Age of Youngest Child at Baseline:	16 or 17	15 or less
AFDC	0.148	0.348
	(0.074)	(0.064)
JF	0.215	0.438
	(0.074)	(0.064)
Difference	0.067	0.089
	(0.053)	(0.010)
Difference in Differences	**-0.023**	
	(0.054)	

Notes: Sample consists of 87,717 case-months: 21 months of data on each of 4,177 cases with non-missing baseline information on age of youngest child. Table gives regression-adjusted fraction of case-months that women participated in welfare by experimental status and age of youngest child at baseline. Robust standard errors computed using clustering at case level.

- Time limits moot for women w/ children aged 16+ at baseline
- But effects of reform on participation are roughly the same

Effects of Time Limit on Participation

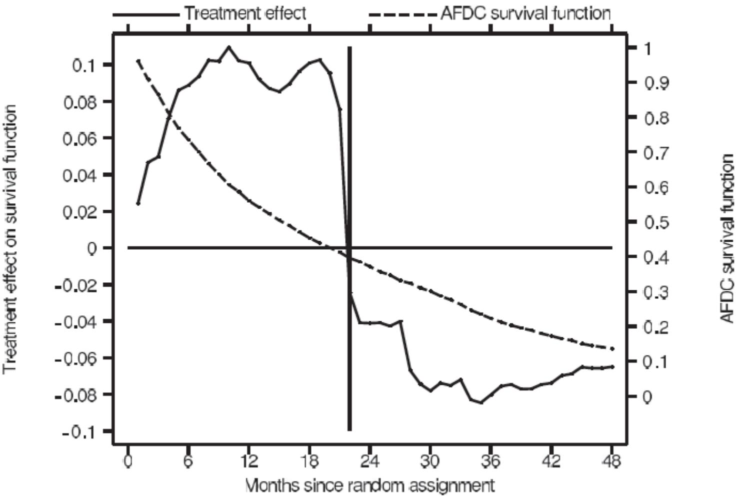

FIGURE 2. FIRST-SPELL MONTHLY SURVIVAL FUNCTION: AFDC GROUP AND TREATMENT EFFECT

Notes: All statistics computed using inverse propensity-score weighting. See text for more details.

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