Anatomy of Welfare Reform:
Announcement and Implementation Effects

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27 January 2010

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Key questions: “Do economic agents respond to welfare reform announcements? Do they adjust their economically salient behavior in response to such announcement? And if so, does it matter?”

Objectives:
- to provide an economic model that captures the main behavioral responses
- application to a specific case:
  - check whether a specific group of individuals (single mothers) change their labor market behavior in anticipation of the introduction of a major tax credit reform in the UK
Expectations are central to economic analysis.

Models in which agents are postulated to be forward looking and to respond to changes in the environment in which they make decisions even before such changes actually occur.

Examples (among many):

- response of foreign exchange rate quotations to macroeconomic announcements (Andersen et al. 2003)
- effect of potential market size on entry of new drugs and pharmaceutical innovation (Acemoglu and Linn 2003)
- impact of announced changes in corporate income taxes on firms’ dividend and investment policies (Kari, Karikallio and Pirttilä 2008)
Much less research has looked at how people respond to announcements of welfare reform

- Some examples (mainly in the case of pension reforms) include:
  - Attanasio and Rohwedder (2003): pension reforms in the UK and their effect on pension wealth and household savings
  - Ashenfelter and Card (2002): how the elimination of mandatory retirement affected faculty retirement in US universities
  - But little emphasis on the changes in individuals’ behavior in anticipation of such reforms

- Yet last 20 years have witnessed a massive introduction of welfare reforms around the world

- Not quantifying announcement/anticipation effects may lead to biased evaluations
Formulate a simple economic model of female labor supply with welfare reform and announcement effects explicitly built in.

The model will stress two mechanisms through which women respond to the announcement of a reform:

- **intertemporal substitution** (frictionless world);
- **adjustment costs** (frictions)

Solve and simulate the model, and assess the different role of the two mechanisms.

Estimate the impact of a UK reform (WFTC) on single mothers’ labor supply and childcare utilization decisions in a reduced form:

- allows us to gauge the presence and magnitude of announcement effects
- allows us to estimate the bias of standard evaluations
Roadmap of the Talk

- Illustration: Simple model of female labor supply
- Simulation results
- Empirical application: Data
- Results
- Conclusion
Model of Female Labor Supply (1)

- Three-period economy in which each woman \( i \) chooses whether to work \( (y_{it} = 1) \) or not \( (y_{it} = 0) \)
- At any period \( t = 1, 2, 3 \), each woman chooses \( y_{it} \) to maximize:

\[
E \left[ \sum_{s=t}^{3} \delta^{s-t} U_{is}(c_{is}, y_{is}, X_{is-1}) | \Omega_{is} \right],
\]

where \( c_{it} \)=level of goods consumption; \( X_{it-1} \)=number of periods woman \( i \) has worked prior to period \( t \) (and, wlog, \( X_{i0} = 0 \)); \( \delta \)=subjective discount factor; \( E[\cdot] \)=expectation operator; \( \Omega_{it} \)=individual’s information set at time \( t \) (and includes information the woman has on possible implementation of a future policy reform).

- Work experience evolves according to

\[
X_{it} = X_{it-1} + y_{it}.
\]
Model (2)

- Period-by-period budget constraint (no saving or borrowing):

\[ c_{it} = w_{it} y_{it} + N_{it}, \]  

where \( w_{it} = \) woman \( i \)'s earnings; \( N_{it} = \) exogenous nonlabor income

- Earnings are both endogenous and stochastic:

\[ w_{it} = w_0 + \alpha X_{it-1} + \beta d_t I(t = s) y_{it} + \epsilon_{it}, \]  

where \( \alpha \) measures the return to work experience; \( I(z) = \) indicator function that is equal to 1 if \( z \) occurs and 0 otherwise; \( \epsilon_{it} = \) technology shock that captures random fluctuations in earnings that are independent of the individual decision process, and assume \( \epsilon_{it} \) has an identical and independent over time logistic distribution.
$d_t$ indicates **implementation of welfare reform** (which, by assumption could occur in period 2 or 3); i.e., $d_t = 1$ if the reform is or already has been implemented and $d_t = 0$ if the reform has not been implemented ($t = 2, 3$)

- $\beta$ in (4) captures the benefit of the reform

- In $\Omega_{it}$ we have **women’s beliefs** about the likelihood that the reform will be in place in **future periods**

- For simplicity, assume that women in period 1 assign an equal probability to the implementation of a reform in periods 2 and 3, such that $\Pr(d_2 = 1|\Omega_1) = \Pr(d_3 = 1|d_2 = 0, \Omega_1) = \pi_1$

- In period 2, women’s beliefs about the likelihood of a reform in the last period is denoted by $\Pr(d_3 = 1|d_2 = 0, \Omega_2) = \pi_2$
Baseline scenario: no additional information is received about likelihood of reform in period 3, $\pi_1 = \pi_2$

Alternative scenarios: there is an announcement at $t = 2$, which becomes part of $\Omega_{i2}$, that may increase individuals’ beliefs about the likelihood of a reform at $t = 3$, such that $\pi_2 > \pi_1$

Reform gives each woman a permanent shift in earnings, provided that the woman works ($y_{it} = 1$). For simplicity, the earnings shift is independent of prior work experience.
Model (5)

- Per period utility is linear and additive in consumption:

\[ U_{it} = c_{it} + \gamma_1 y_{it} + \gamma_2 X_{it-1} y_{it} + \gamma_3 c_{it} y_{it} \quad (5) \]

- \( U \) is decreasing in \( y_{it} \) (i.e., \( \gamma_1 < 0 \)) reflecting disutility of work, and increasing in consumption, \( c_{it} \)

- If \( \gamma_2 \neq 0 \), then utility function is **not intertemporally separable**:
  - \( \gamma_2 > 0 \): habit formation in the labor market
  - \( \gamma_2 < 0 \): increasing current disutility of work with previous work effort or increasing propensity to substitute nonmarket time in subsequent periods
Model (6)

- **Labor market frictions**, reflected in the choice set available to women, that is $y_{it} \in J_{it}$, where $J_{it}$ is the work decision choice set available to $i$ in $t$:
  - $J_{it} = \{0\}$ (i.e., no job is available) with probability $(1 - \lambda_t)$ and
  - $J_{it} = \{0, 1\}$ (i.e., choice set includes both ‘not working’ and ‘working’) with probability $\lambda_t$

- Assume that there is no current labor market friction for a woman who worked in the previous period, that is, $\lambda_t(y_{it-1}) = 1$ if $y_{it-1} = 1$, while the arrival rate if not working in the last period is $\lambda_t(0) < 1$. 
Standard solution method for finite horizon dynamic programs is **backward recursion**

Just an example \((t = 3)\)

Let \(V_{it}(X_{it-1}, \epsilon_{it})\)\(=\)maximum of expected discounted lifetime utility given \(X_{it-1}\) prior periods of employment and a wage draw of \(\epsilon_{it}\):

\[
V_{it}(X_{it-1}, d, \epsilon_{it}) = \max[V_{1it}(X_{it-1}, \epsilon_{it}), V_{0it}(X_{it-1}, \epsilon_{it})],
\]

where \(V_{1it}(\cdot)\) and \(V_{0it}(\cdot)\) denote the expected discounted lifetime utilities if the woman \(i\) works in \(t\) \((y_{it} = 1)\) and does not work \((y_{it} = 0)\) respectively.
At \( t = 3 \), the value functions when \( J_{i3} = \{0, 1\} \) are:

\[
V_{i3}^1(X_{i2}, d_3, \epsilon_{i3}) = (1 + \gamma_3)(\alpha X_{i2} + \beta d_3 + N_{i3} + \epsilon_{i3}) + \gamma_1 + \gamma_2 X_{i2}
\]

\[
V_{i3}^0(X_{i2}, d_3) = N_{i3}.
\]

Woman works if \( V^1_{it}(\cdot) > V^0_{it}(\cdot) \). That is:

\[
y_{i3} = 1 \quad \text{iff} \quad \epsilon_{i3} \geq -\alpha X_{i2} - \beta d_3 - \frac{\gamma_3 N_{i3} + \gamma_1 + \gamma_2 X_{i2} \epsilon_{i3}}{1 + \gamma_3}
\]

\[
y_{i3} = 0 \quad \text{otherwise}
\]
Thus, the expected value in period 3 for a woman who does not face labor market frictions is

\[
E V_{i_3}^{0,1} (X_{i_2}, d_3) = \Pr(\epsilon_{i_3} > \epsilon^*_i (X_{i_2}, d_3)) \left\{ (1 + \gamma_3) \left[ \alpha X_{i_2} + \beta d_3 + N_{i_3} \right. \right.
\]
\[
\left. \left. + E(\epsilon_{i_3} | \epsilon_{i_3} > \epsilon^*_i (X_{i_2}, d_3)) \right] + \gamma_1 + \gamma_2 X_{i_2} \right\} + \left[ 1 - \Pr(\epsilon_{i_3} > \epsilon^*_i (X_{i_2}, d_3)) \right] N_{i_3}
\]

(10)
Solution (4)

- When $J_{i3} = \{0\}$, that is, when the woman has **no job available** because of **labor market frictions**, the expected value is:

  \[
  EV_{i3}^{\{0\}}(X_{i2}, d_3) = N_{i3}.
  \]  
  \(\text{(11)}\)

- Combining (10) and (11) yields expected value to each woman in period 3, namely

  \[
  EV_{i3}(X_{i2}, y_{i2}, d_3) = \lambda_3 EV_{i3}^{\{0,1\}}(X_{i2}, d_3) + (1 - \lambda_3)EV_{i3}^{\{0\}}(X_{i2}, d_3).
  \]  
  \(\text{(12)}\)
Simulation Results (1)

- Simulate choice decisions of 1 million women, under 3 different alternative specifications. Set $\delta = 0.9$, $w_0 = 1$, $\alpha = 0$, $\beta = 1$, $\gamma_1 = \gamma_3 = 0$
  - **Case 1**: no labor market (search) frictions ($\lambda(0) = 1$), utility is separable ($\gamma_2 = 0$)
  - **Case 2**: no intertemporal substitution ($\gamma_2 = 0$), but labor market frictions ($\lambda(0) = 0.5$)
  - **Case 3**: no frictions ($\lambda(0) = 1$), but intertemporal substitution ($\gamma_2 = -1.5$, i.e., disutility of work depends on past work decisions)
For each case, consider 5 different scenarios:

- **Baseline scenario**: $\pi_1 = \pi_2 = 0$, women do not envisage possibility of reform
- **Scenario 1**: $\pi_1 = \pi_2 = 0$: no pre-implementation announcement and the reform is completely unanticipated; $d_3 = 1$: reform implemented at $t = 3$
- **Scenario 2**: $\pi_1 = 0$: no expectation of a future reform in period 1, $\pi_2 = 1$: implementation of the reform is announced in period 2; $d_3 = 1$: reform implemented at $t = 3$
- **Scenario 3**: $\pi_1 = 0.5$: 50-percent chance to introduction of reform implemented in either 2 or 3; $\pi_2 = 1$, implementation of the reform in period 3 is announced in period 2; $d_3 = 1$: reform implemented at $t = 3$
- **Scenario 4**: $\pi_1 = 0; \pi_2 = 1$: announcement of a completely unanticipated reform at $t = 2$, but $d_3 = 0$: the reform fails to materialize
Fig 1. Trends in Employment Rates

No frictions and no intertemporal substitution

\[ \delta = 0.9, \ \alpha = 0, \ \beta = 1, w_0 = 1, \gamma_1 = \gamma_3 = 0, \ \lambda(0) = 1, \ y_2 = 0. \] 
Baseline: \( \pi_1 = \pi_2 = 0 \) & no reform; 
scenario 1: \( \pi_1 = \pi_2 = 0 \) & reform in period 3; 
scenario 2: \( \pi_1 = 0, \ \pi_2 = 1 \) & reform in period 3; 
scenario 3: \( \pi_1 = 0.5, \ \pi_2 = 1 \) & reform in period 3; 
scenario 4: \( \pi_1 = 0, \ \pi_2 = 1 \) & no reform in period 3;
**Fig 2. Trends in Employment Rates**  
*Frictions - no intertemporal substitution*

- $\delta=0.9$, $\alpha=0$, $\beta=1$, $w_o=1$, $y_1=y_3=0$, $\lambda(0)=0.5$, $y_2=0$. Baseline: $\pi_1=\pi_2=0$ & no reform;  
- scenario 1: $\pi_1=\pi_2=0$ & reform in period 3; scenario 2: $\pi_1=0$, $\pi_2=1$ & reform in period 3;  
- scenario 3: $\pi_1=0.5$, $\pi_2=1$ & reform in period 3; scenario 4: $\pi_1=0$, $\pi_2=1$ & no reform in period 3;
Fig 3. Trends in Employment Rates

No frictions - intertemporal substitution

δ=0.9, α=0, β=1, w_o=1, γ_1=γ_3=0, λ(0)=1, γ_2=-1.5. Baseline: π_1=π_2=0 & no reform;
scenario 1: π_1=π_2=0 & reform in period 3; scenario 2: π_1=0, π_2=1 & reform in period 3;
scenario 3: π_1=0.5, π_2=1 & reform in period 3; scenario 4: π_1=0, π_2=1 & no reform in period 3;
Summary of Simulation Results (1)

No frictions and no intertemporal substitution (Figure 1):
- Employment rates are constant before the reform, while there is a large increase in period 3 with introduction of the reform (true also when we allow for anticipation and announcement of the reform in period 2)
- Women are not forward looking

Frictions and no intertemporal substitution (Figure 2):
- Employment rates are lower (lower job arrival rate, due to frictions)
- Gains from working in the first two periods as it guarantees the option to work in the subsequent period
- Both anticipation of a possible reform and announcement in period 2 lead to an increase in employment rates in the pre-implementation periods
No frictions and intertemporal substitution (disutility of work increasing with work experience) (Figure 3):

- Employment rates decline over time before the last period.
- If there is announcement of an unanticipated reform to be implemented in period 3, then employment rates in the same period 2 fall, in anticipation of the higher earnings and employment rates in period 3.
- Notice also that anticipation of a possible future reform leads to a lower employment rates in period 1.
Use the introduction of the Working Families’ Tax Credit (WFTC) in the UK in October 1999

Analyze the response of single mothers in terms of labor supply and childcare utilization

Ample room for announcement effects:

- **November 1997**: with the Pre-Budget Statement, the Government announced that a new tax credit for working families would be one fundamental element of its welfare-to-work strategy
- **March 1998**: Budget speech set out the main features of the new WFTC, which was to replace Family Credit in October 1999
Data Sources

- **British Household Panel Study 1991–2002**
  - Longitudinal, (relatively) small sample
  - Estimating sample: Almost 3,500 unmarried non-cohabiting women who are at least 16 and were born after 1941 (thus aged at most 60 in 2002) [excludes long-term sick and disabled, and those in full-time education in any given year], for a total of 15,260 person-wave observations (about 2,000 single childless and 1,500 single mothers)

- **Family Resources Survey 1995–2002**
  - Cross sectional, large sample
  - Estimating sample: Approx. 76,000 single women (aged 16+ and less than 60), about 48,000 single childless and 28,000 single mothers
Reduced-Form Analysis

- Estimate reduced-form DDD regressions of the form:

\[ O_{it} = a_1 + a_2 \ell_{it} + (a_{31} + a_{32} \ell_{it})t + [a_{41} + a_{42}(t - s)]I(t \geq s) \]

\[ + b \ell_{it}I(t \geq s) + b_0 \ell_{i \tau}I(\tau = 1998) \]

\[ + W'_{it} \vartheta + \mu_i + \varepsilon_{it}, \]  

(13)

- \( s = 1999 \)

- \( b = \) treatment effect (i.e., the WFCT effect)

- \( b_0 = \) anticipation effect

- (13) allows for different trends for control and treatment group

- (13) allows for common non-WFTC related policy effect in 1999 (and after) both through change in intercept and slope

- includes fixed effects (\( \mu_i \)), and allows for compositional changes over time (subscript t) and \( W \) variables

- except for inclusion of regressors, (13) is similar to DDD approach
Figure 4. Working 16 or More Hours per Week – Single Childless Women and Lone Mothers (BHPS sample)

(a) Working 16+ hours per week

Proportion

Year

1991 1993 1995 1997 1999 2001

1999

.8

.6

.4

.2

.636

.408

single childless

lone mothers
Figure 4. Working 16 or More Hours per Week – Single Childless Women and Lone Mothers (BHPS sample)

(b) Working 16+ hours per week
(Proportions for lone mothers are by age group of youngest child)
Figure 5. Timing of New Jobs between 1997 and 1998 (BHPS sample)

(b) Timing of new jobs
(Job started between September 1997 and December 1998)

Month/Year when New Job Started
Proportion

- Single childless
- Lone mothers

Graphical Overview of WFTC on Employment (3)
WFTC Treatment and Announcement Effects (1)

Outcome: Working 16 or more hours per week

<table>
<thead>
<tr>
<th></th>
<th>BHPS (N=15,260)</th>
<th>BHPS (N=15,260)</th>
<th>FRS (N=76,886)</th>
<th>FRS (N=76,886)</th>
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<tr>
<td><strong>OLS</strong></td>
<td></td>
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<td>0.051</td>
<td>0.060</td>
<td>0.033</td>
<td>0.040</td>
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<tr>
<td></td>
<td>(0.016)</td>
<td>(0.018)</td>
<td>(0.008)</td>
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<tr>
<td>Announcement</td>
<td>0.029</td>
<td>0.018</td>
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<td>0.018</td>
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<tr>
<td></td>
<td>(0.014)</td>
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<td>(0.016)</td>
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<tr>
<td><strong>FE</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>0.049</td>
<td>0.059</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.019)</td>
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<tr>
<td>Announcement</td>
<td>0.027</td>
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<tr>
<td></td>
<td>(0.015)</td>
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### Other Outcomes: OLS estimates

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<th></th>
<th>BHPS</th>
<th>BHPS</th>
<th>FRS</th>
<th>FRS</th>
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<td><strong>Full time employment</strong></td>
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<tr>
<td>Treatment</td>
<td>0.045</td>
<td>0.054</td>
<td>0.030</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.009)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Announcement</td>
<td>0.026</td>
<td></td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td></td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>0.056</td>
<td>0.061</td>
<td>0.052</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Announcement</td>
<td>0.017</td>
<td></td>
<td>0.016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td></td>
<td>(0.012)</td>
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</tr>
<tr>
<td><strong>Hours of work</strong> (including zeros)</td>
<td></td>
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</tr>
<tr>
<td>Treatment</td>
<td>3.32</td>
<td>4.60</td>
<td>3.58</td>
<td>4.21</td>
</tr>
<tr>
<td></td>
<td>(0.73)</td>
<td>(0.93)</td>
<td>(0.27)</td>
<td>(0.28)</td>
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<tr>
<td>Announcement</td>
<td>2.41</td>
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<td>1.91</td>
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<tr>
<td></td>
<td>(0.75)</td>
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<td>(0.29)</td>
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Eligible Employment by Age of Youngest Child and Number of Children — BHPS, FE estimates

<table>
<thead>
<tr>
<th>Specification (i)</th>
<th>Specification (ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Treatment</td>
</tr>
<tr>
<td>One child aged 0–4</td>
<td>0.085 (0.024)</td>
</tr>
<tr>
<td>One child aged 5–10</td>
<td>0.070 (0.031)</td>
</tr>
<tr>
<td>One child aged 11–18</td>
<td>0.032 (0.022)</td>
</tr>
<tr>
<td>Two children or more, youngest 0–4</td>
<td>0.038 (0.021)</td>
</tr>
<tr>
<td>Two children or more, youngest 5–10</td>
<td>0.020 (0.024)</td>
</tr>
<tr>
<td>Two children or more, youngest 11–18</td>
<td>0.009 (0.033)</td>
</tr>
<tr>
<td>Paid childcare utilization</td>
<td>BHPS (N=5,616)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
</tr>
<tr>
<td>Announcement</td>
<td>−0.004</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
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</table>

<table>
<thead>
<tr>
<th>Childcare use by child’s age and number of children</th>
<th>BHPS (N=5,616)</th>
<th>FRS (N=35,469)</th>
</tr>
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<tbody>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One child aged 0–4</td>
<td>0.047</td>
<td>0.044</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>One child aged 5-10</td>
<td>0.038</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Two children or more, youngest 0–4</td>
<td>0.013</td>
<td>0.011</td>
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<tr>
<td></td>
<td>(0.019)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Announcement</td>
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<tr>
<td>One child aged 0–4</td>
<td>0.003</td>
<td>−0.003</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>One child aged 5-10</td>
<td>0.002</td>
<td>−0.001</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Two children or more, youngest 0–4</td>
<td>−0.006</td>
<td>−0.010</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.009)</td>
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## Eligible Employment Transitions (BHPS)

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<thead>
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<th>Persistence probability</th>
<th>Entry probability</th>
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<tbody>
<tr>
<td>Treatment</td>
<td>0.058 (0.028)</td>
<td>0.070 (0.033)</td>
</tr>
<tr>
<td>Announcement</td>
<td>0.024 (0.008)</td>
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<tr>
<td>N</td>
<td>6,478</td>
<td>6,478</td>
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</table>
Summary of WFTC Results

- Strong evidence of an **announcement** effect of WFTC on labor supply:
  - **Large** and **positive** in the case of **employment** outcomes
  - Robust across outcomes and across data sources
  - Treatment effect estimates that ignore announcement effects are **biased downward**, between 15% and 35%
  - If announcement effect is considered part of the reform, then **downward bias** is cumulatively **huge**, and of the order of 60%–75%
  - Results are consistent with story based on **labor market frictions** rather than with story based on **intertemporal substitution**

- **Formal childcare** utilization:
  - **No announcement effect**: Women had to pay for formal childcare but would have *not* received benefits to cover such cost before the introduction of WFTC
  - Sizeable implementation effects
  - Preliminary work shows strong **announcement effects** in the case of **informal (unpaid)** childcare utilization
Our analysis stresses the importance of performing welfare evaluations with the notion that agents are forward looking. When this is the case, the announcement of a reform may have effects on behavior even before the introduction of the reform itself.

- Example of WFTC provides strong and convincing evidence of announcement effects.
- Results are consistent with the notion of labor market frictions (and not with intertemporal substitutability).
- Neglecting such effects may lead to highly biased treatment effect estimates along many important margins.

If agents are forward looking and we allow for anticipation effects, behavior can be affected not only by the implementation of a reform but also by the absence of a reform.
Conclusions (2)

What next?

- Look at other examples (e.g., EITC in the United States) and document the extent of anticipation/announcement effects.
- Pick one specific example (e.g., WFTC) and estimate a structural model in order to:
  - improve understanding the interaction between labor market imperfections (frictions) and lone mothers' behavior (before as well as after the reform); and
  - be able to simulate alternative changes to the WFTC program.