# Marriage, Labor Supply and the Dynamics of the Social Safety Net

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# Marriage, labor supply and the welfare system

- Low-income families insure shocks through the welfare system
  - In the U.S., single mothers are the primary beneficiaries
- Focus of reform debates: provide insurance while limiting
  - Disincentives to work
  - Incentives to be a single parent
- Most studies of welfare focus on single mothers only
  - Yet, marital status and welfare eligibility are closely tied

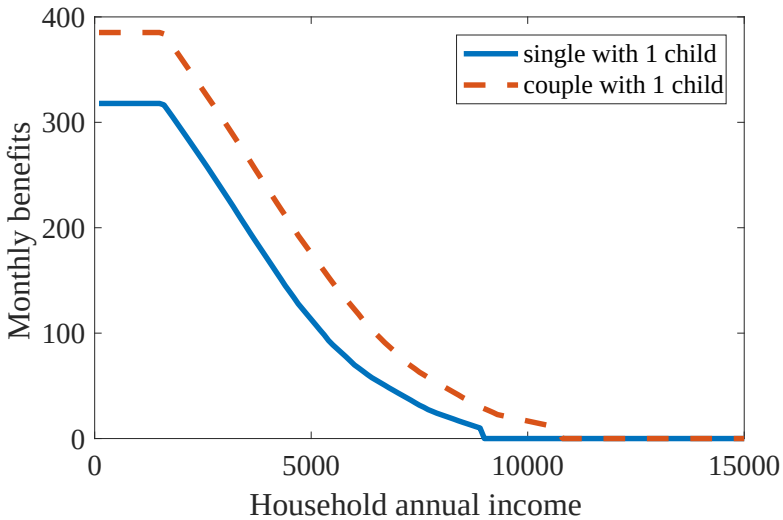
# Our approach

- We study the role of time limits in welfare eligibility
  - Example: 1996 welfare reform
- Examine data on the impacts on
  - Welfare program participation
  - Labor supply
  - Marital status
- We develop and estimate a dynamic model that
  - Incorporates dynamic incentives
  - Accounts for household formation and dissolution
- Use model to understand how marriage and divorce interact with the social safety net

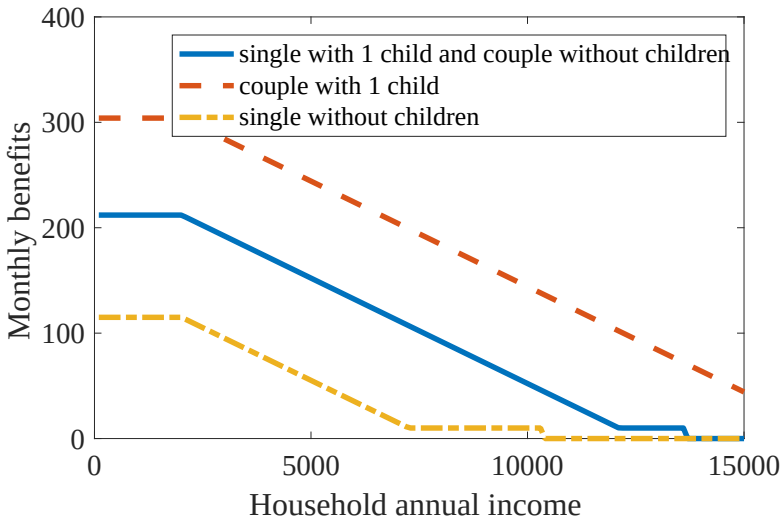
# The 1996 Welfare Reform and Time Limits

- PRWORA signed in August 1996
- Shift from welfare entitlement to time limited support
- Federal block grants covering benefits for up to 60 months
  - Pre-reform (AFDC): eligible if youngest child under 18
  - Post reform (TANF): federal funding covers 5 years max
- States could impose their own rules: from 21 to 60 months
- State-level variation in timing of adoption (1995-1998)

# Welfare generosity and household structure




(a) AFDC




(b) Food stamps

*Notes*: Average monthly AFDC and food stamps benefits by household annual income

# Related literature

- U.S. welfare reform
  - Blank 2002; Grogger and Michalopoulos, 2003; Fang and Keane 2004; Grogger and Karoly, 2005; Bitler, Gelbach, Hoynes, Zavodny 2004; Chan 2013; Kline and Tartari 2015; Ziliak 2016; Moffitt et al. 2015
- Collective model and dynamic household decision making
  - Chiappori 1988, 1992; Blundell, Chiappori, Meghir 2005; Ligon, Thomas and Worrall 2000, 2002; Mazzocco 2007; Mazzocco et al. 2013; Voena 2015; Fernandez and Wong 2017
- Dynamic models of labor supply
  - Keane and Wolpin, 2010; Low, Meghir and Pistaferri 2010; Blundell, Dias, Meghir and Shaw 2016

# Data and empirics

Model and estimation

Reform

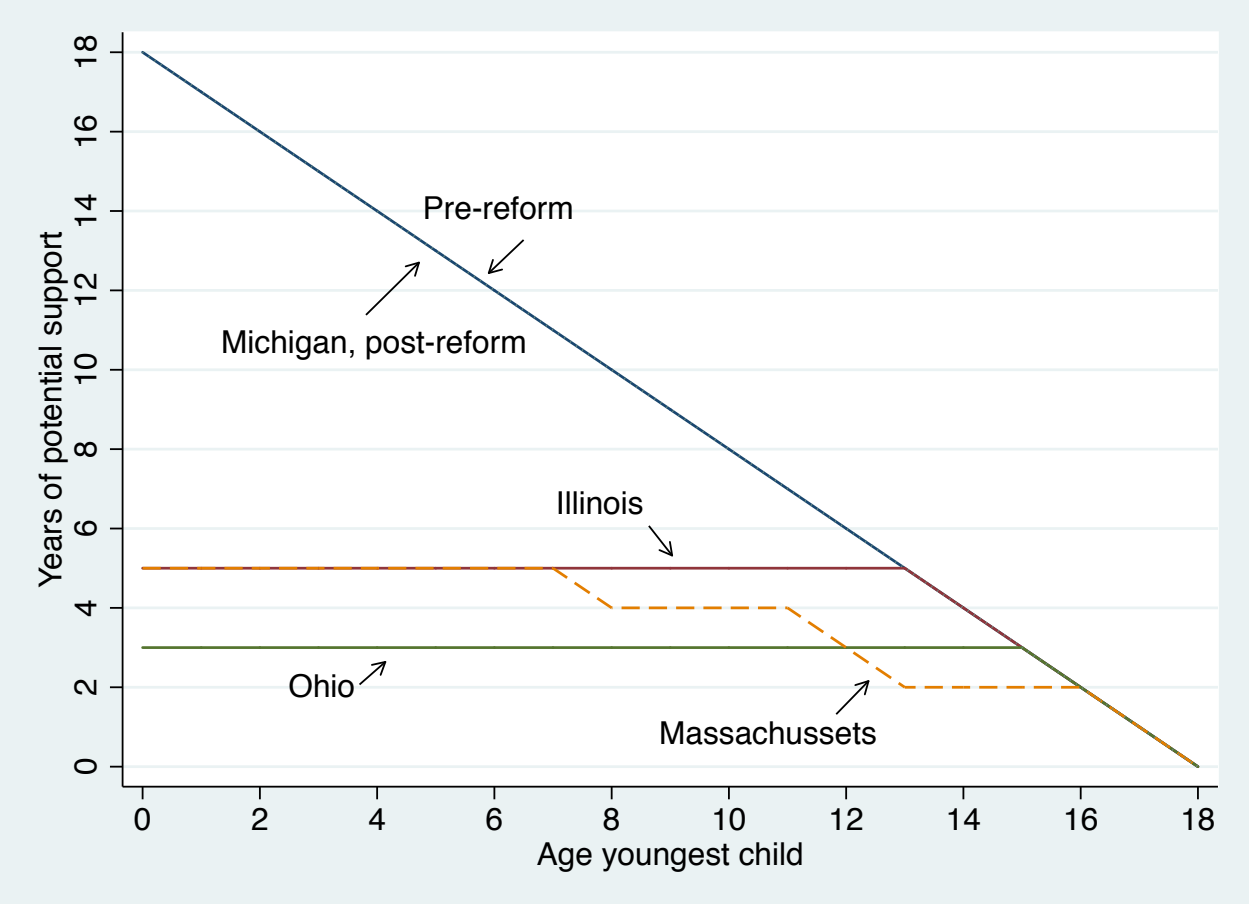
Importance of marriage

Consumption equivalents

# Datasets

- Survey of Income and Program Participation (SIPP)
  - Rolling Panel 1985-2008 (years 1984-2011)
  - Start with 1990 panel (after 1988 FSA)
  - Information on our outcomes of interest
- Current Population Survey
  - March survey
  - Data frame: 1990-2011
- Consider women who did not complete college

# Variation Across States and Age of Child




Source: Grogger and Michalopulos (2003), Mazzolari and Ragusa (2012)

# Examples

- Youngest child is 10 in year $t$ and the time limit is 5 years:
  $Exposed = 1$
- Youngest child is 13 in year $t$ and the time limit is 5 years:
  $Exposed = 0$
- Youngest child is 13 in year $t$ and the time limit is 2 years:
  $Exposed = 1$
- Youngest child is 17 in year $t$ and the time limit is 2 years:
  $Exposed = 0$

# Empirical strategy

Household $i$, demographic characteristics $d$, state $s$, year $t$:

$$y_{idst} = \alpha Expsd_{dst} Post_{st} + \beta' X_{idst} + f_{st} + f_{ds} + f_s + f_t + f_d + \varepsilon_{idst}$$

- $Exposed = 0$ unaffected households
- $Post = 1$ after the reform
- $X$ controls, $f$ fixed effects
  - Age dummies
  - Household structure controls
  - EITC and unemployment rate controls
  - Month-by-year fixed effects
  - Year-by-state fixed effects
  - State-by-demographic group fixed effects

Sample of households with dependent children

# Welfare Utilization and Employment

| | Panel A: Up to 2002 | | | | | |
|---|---|---|---|---|---|---|
| | Whole sample | | Married women | | Unmarried women | |
| | SIPP | CPS | SIPP | CPS | SIPP | CPS |
| | *AFDC/TANF Utilization* | | | | | |
| $Exposed_{dst}Post_{st}$ | -0.030*** | -0.016*** | -0.011*** | -0.003** | -0.087*** | -0.084*** |
| | (0.004) | (0.003) | (0.003) | (0.002) | (0.015) | (0.013) |
| Mean pre-reform | 0.098 | 0.077 | 0.035 | 0.019 | 0.297 | 0.304 |
| Obs | 254,627 | 112,128 | 188,483 | 88,522 | 66,144 | 23,606 |
| $R^2$ | 0.12 | 0.07 | 0.08 | 0.03 | 0.26 | 0.15 |
| | *Employment* | | | | | |
| $Exposed_{dst}Post_{st}$ | 0.014 | -0.002 | -0.001 | -0.017 | 0.050*** | 0.054** |
| | (0.012) | (0.011) | (0.014) | (0.011) | (0.014) | (0.026) |
| Mean pre-reform | 0.640 | 0.647 | 0.643 | 0.654 | 0.631 | 0.620 |
| Obs | 254,627 | 112,128 | 188,483 | 88,522 | 66,144 | 23,606 |
| $R^2$ | 0.12 | 0.06 | 0.11 | 0.05 | 0.21 | 0.13 |

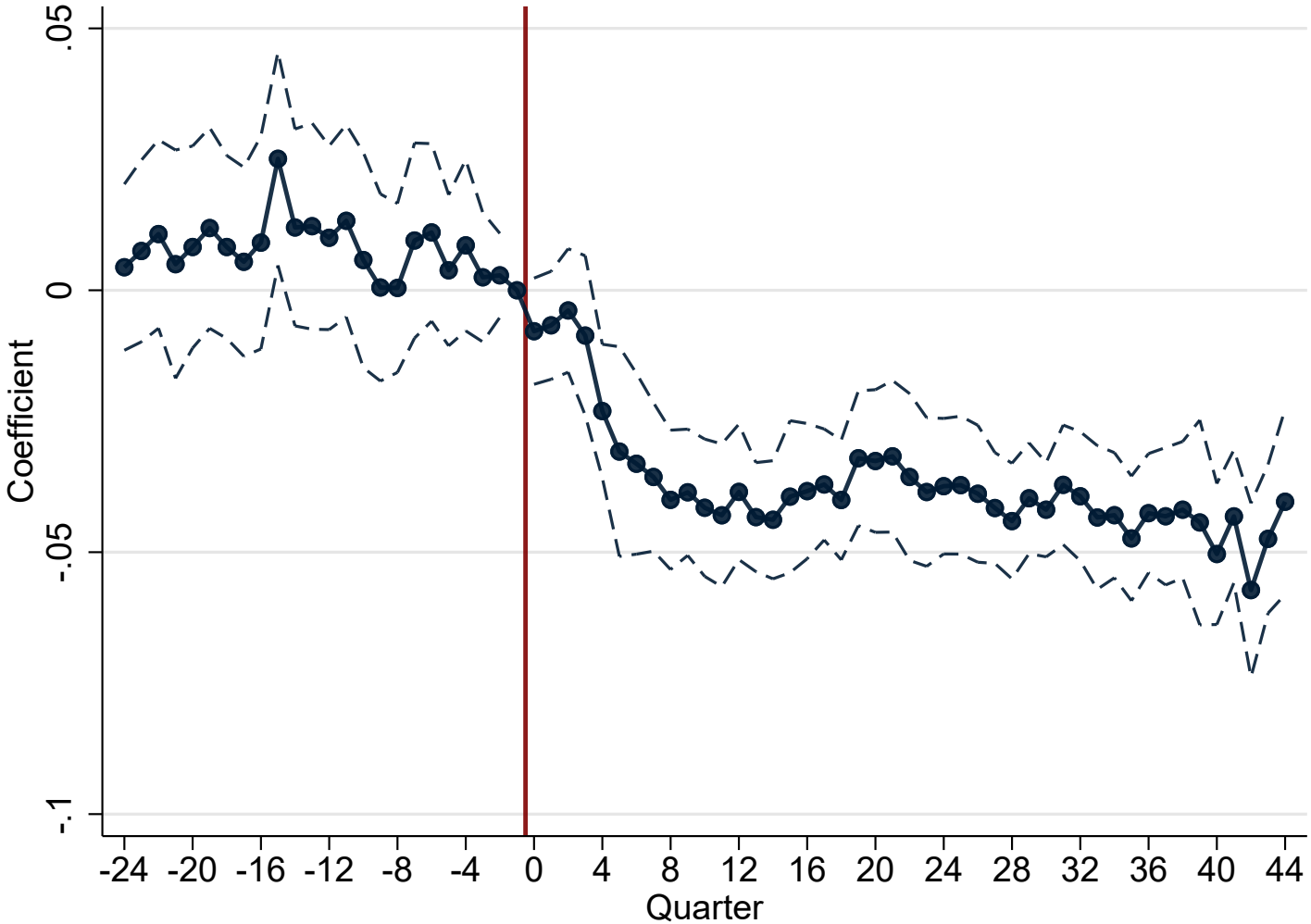
*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS. ▸ No child care

# Welfare Utilization and Employment

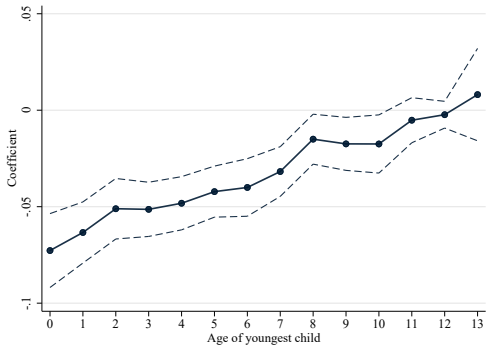
| | Panel B: Whole sample period | | | | | |
|---|---|---|---|---|---|---|
| | Whole sample | | Married women | | Unmarried women | |
| | SIPP | CPS | SIPP | CPS | SIPP | CPS |
| | *AFDC/TANF Utilization* | | | | | |
| $Exposed_{dst}Post_{st}$ | -0.038*** | -0.022*** | -0.013*** | -0.005*** | -0.108*** | -0.111*** |
| | (0.004) | (0.002) | (0.002) | (0.001) | (0.012) | (0.010) |
| Mean pre-reform | 0.098 | 0.077 | 0.035 | 0.019 | 0.293 | 0.298 |
| Obs | 336,129 | 153,498 | 242,825 | 119,905 | 93,304 | 33,593 |
| $R^2$ | 0.11 | 0.07 | 0.07 | 0.03 | 0.27 | 0.15 |
| | *Employment* | | | | | |
| $Exposed_{dst}Post_{st}$ | 0.007 | -0.014 | -0.014 | -0.031*** | 0.055*** | 0.053** |
| | (0.011) | (0.009) | (0.014) | (0.010) | (0.013) | (0.021) |
| Mean pre-reform | 0.641 | 0.648 | 0.644 | 0.655 | 0.632 | 0.623 |
| Obs | 336,129 | 153,498 | 242,825 | 119,905 | 93,304 | 33,593 |
| $R^2$ | 0.11 | 0.06 | 0.11 | 0.05 | 0.19 | 0.12 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS. ▸ No child care

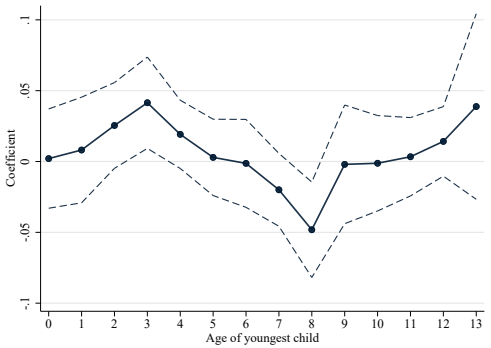
# Program Participation



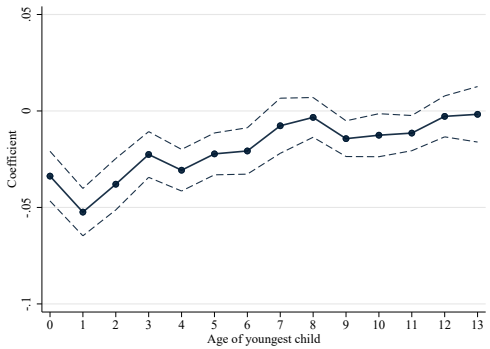
# Program Participation and Employment Dynamics by Child Age



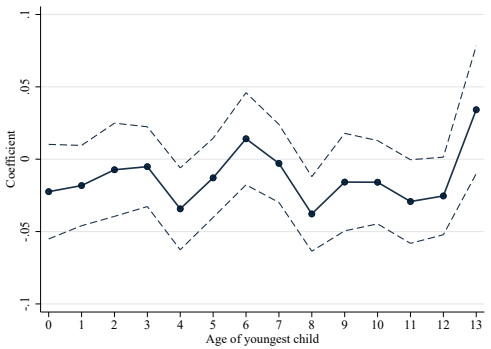

(a) SIPP: Program participation




(b) SIPP: Employment




(c) CPS: Program participation




(d) CPS: Employment

*Notes:* Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Marital Status

| | Panel A: Up to 2002 | | | |
|---|---|---|---|---|
| | SIPP | CPS | SIPP | CPS |
| | *Gets Divorced/separated* | | *Divorced/separated* | |
| $Exposed_{dst}Post_{st}$ | 0.000 | 0.003 | -0.027*** | -0.015* |
| | (0.001) | (0.005) | (0.007) | (0.008) |
| Mean pre-reform | 0.009 | 0.014 | 0.150 | 0.126 |
| Obs | 160,210 | 37,617 | 254,627 | 112,128 |
| $R^2$ | 0.01 | 0.02 | 0.03 | 0.01 |
| | *Gets Married* | | *Married* | |
| $Exposed_{dst}Post_{st}$ | -0.000 | -0.016 | 0.004 | -0.007 |
| | (0.003) | (0.015) | (0.007) | (0.010) |
| Mean pre-reform | 0.025 | 0.047 | 0.758 | 0.796 |
| Obs | 54,441 | 9,727 | 254,627 | 112,128 |
| $R^2$ | 0.04 | 0.08 | 0.05 | 0.05 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Marital Status

| | Panel B: Whole sample period | | | |
|---|---|---|---|---|
| | SIPP | CPS | SIPP | CPS |
| | *Gets Divorced/separated* | | *Divorced/separated* | |
| $Exposed_{dst}Post_{st}$ | -0.001 | -0.002 | -0.033*** | -0.013* |
| | (0.001) | (0.003) | (0.009) | (0.006) |
| Mean pre-reform | 0.009 | 0.014 | 0.151 | 0.126 |
| Obs | 207,562 | 52,528 | 336,129 | 153,498 |
| $R^2$ | 0.01 | 0.02 | 0.03 | 0.01 |
| | *Gets Married* | | *Married* | |
| $Exposed_{dst}Post_{st}$ | -0.001 | -0.019* | -0.002 | -0.014* |
| | (0.003) | (0.011) | (0.011) | (0.008) |
| Mean pre-reform | 0.025 | 0.045 | 0.756 | 0.793 |
| Obs | 77,489 | 14,157 | 336,129 | 153,498 |
| $R^2$ | 0.04 | 0.07 | 0.05 | 0.05 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Summary: Reduced Form Evidence

Effect of time limits:

1. Welfare utilization declined
2. Employment increased among single women
3. Decline in divorce
4. No robust effects on marriage (or fertility)

# The model

- Life cycle setup
- Choices
  - Marriage and divorce
  - Participation in AFDC/TANF
  - Female labor supply
  - Consumption and savings
- Opportunity set
  - AFDC/TANF, Food stamps, EITC
  - Stochastic wages
  - Imperfect capital markets
  - Marriage market
  - Stochastic fertility

# Welfare benefits and time limits

- Before welfare reform

$$b_t(k_t, w_t^W P_t^W, m_t y_t^M, A_t)$$

- After welfare reform

$$b_t(\cdot, TB_t) = \begin{cases} = 0 & if \quad TB_t > \text{time limit} \\ = b_t(\cdot) & if \quad TB_t \leq \text{time limit} \end{cases}$$

- Additional exogenous programs: food stamps, EITC

# The problem of a single woman

- Chooses consumption, work and welfare program participation
- Evaluates marital offers if they arrive (with prob. $\lambda_t$)
- May or may not have children
- Stochastic arrival of a newborn

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$$V_t^{Ws} = max \left\{ u(c_t^{Ws}, P_t^{Ws}, B_t^{Ws}) \right.$$
$$\left. +\beta E_t[\lambda_{t+1}[(1-m_{t+1})V_{t+1}^{Ws} + m_{t+1}V_{t+1}^{Wm}] + (1-\lambda_{t+1})V_{t+1}^{Ws}] \right\}$$

s.t.

$$\frac{A_{t+1}^{Ws}}{1+r} = A_t^{Ws} - \frac{c_t^{Ws}}{e(k_t)} + (w_t^{Ws} - CC^a)P_t^{Ws} + B_t^{Ws}b_t + G_t^{Ws}$$

$$A_t^{Ws} \geq 0$$

# The problem of a single man

- Receives an exogenous stochastic level of income (including 0)
- Chooses consumption
- No children
- Evaluates marital offers if they arrive (with prob $\lambda_t$)

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- No children
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$$V_t^{Ms} = max \left\{ u^{Ms}(c_t^{Ms}, P_t^{Ms}) \right.$$
$$\left. + \beta E_t[\lambda_{t+1}[(1-m_{t+1})V_{t+1}^{Ms} + m_{t+1}V_{t+1}^{Mm}] + (1-\lambda_{t+1})V_{t+1}^{Ms}] \right\}$$

s.t.

$$\frac{A_{t+1}^{Ms}}{1+r} = A_t^{Ms} - c_t^{Ms} + y_t^{Ms} + G_t^{Ms}$$

$$A_t^{Ms} \geq 0$$

# The problem of a couple

- Chooses consumption, work and welfare program participation
- Collective decision with limited commitment
- Stochastic arrival of a newborn
- Anticipates possible future divorce decision

# The problem of a couple

- Chooses consumption, work and welfare program participation
- Collective decision with limited commitment
- Stochastic arrival of a newborn
- Anticipates possible future divorce decision

$$V_t^m = max \ \Big\{\theta_t^W \ u(c_t^{Wm}, P_t^{Wm}, B_t^m) + \theta_t^M \ u(c_t^{Mm}, P_t^{Mm}) + L^\tau$$
$$+\beta E_t \left[(1-d_{t+1})V_{t+1}^m + d_{t+1}\left(\theta_t^W V_{t+1}^{Ws} + \theta_t^M V_{t+1}^{Ms}\right)\right]\Big\}$$

s.t. $$\frac{A_{t+1}}{1+r} = A_t - \frac{F(c_t^{Wm}, c_t^{Mm})}{e(k_t)} + (w_t^{Ws} - CC^a)P_t^{Wm} + y_t^M + B_t^m b_t + G_t$$

$$A_t \geq 0$$

$$\text{Value of marriage}_t^j (= V_t^{im}) \geq \text{Value of divorce}_t^j (= V_t^{is})$$

# Marriage decision

- Singles meet a potential match with probability $\lambda_t$
  - Draw from singles' empirical distribution of $\{A_t^j, y_t^j, [k_t, TB_t]\}$
  - Draw match quality $L^0$
- Marriage decision
  - Get married $(m_t = 1)$ iff

$$\exists \ feasible \ \ \boldsymbol{\theta_t} \ \ s.t. \ \ V_t^{jm}(\theta_t^j) \geq V_t^{js} \quad \text{for} \ \ j = H, W$$

  - $\boldsymbol{\theta_t}$ at the time of marriage equates gains from marriage

# Divorce decision

- Uncertainty: match quality $L^{\tau}$, spouses' income
- Re-allocation of resources in the marriage
  - Limited commitment (see Mazzocco 2007, Voena 2015)
- Divorce $(d_t = 1)$ iff

$$\nexists \; feasible \;\; \boldsymbol{\theta_t} \;\; s.t. \;\; V_t^{jM}(\theta_t^j) \geq V_t^{jS} \quad \text{for} \quad j = H, W$$

# Fertility, Match quality, and Earnings

- Fertility process
  - $P(newborn_t|k_t^a) = g(t, m_{t-1})$
- Match quality
  - Initial quality $L^0$
  - After $\tau$ years of marriage: $L^\tau = L^{\tau-1} + \xi^\tau$
- Earnings process

$$y_{it}^M \in \{0, w_{it}^M\}$$
$$ln(w_{it}^j) = a_0^j + a_1^j age_t^j + a_2^j \cdot (age_t^j)^2 + z_{it}^j$$
$$z_{it}^j = z_{i,t-1}^j + \zeta_{it}^j$$
$$j \in \{F, M\}$$

# Estimation steps

- Parameters
  1. Fix a set of parameters exogenously

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     - Wage and employment processes
     - Fertility process
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  3. Remaining parameters by MSM targeting pre-reform moments
     - Cost of working
     - Probability of meeting a partner
     - Distribution of match quality
     - Cost of welfare participation (stigma)

# Estimation steps

- Parameters
  1. Fix a set of parameters exogenously
  2. Estimate directly from data
     - Wage and employment processes
     - Fertility process
     - Singles' types distribution for men and women
  3. Remaining parameters by MSM targeting pre-reform moments
     - Cost of working
     - Probability of meeting a partner
     - Distribution of match quality
     - Cost of welfare participation (stigma)
- Moments
  - Draw 4-year simulated panels as in SIPP data
  - Match pre-reform moments from 1960s birth cohort of SIPP

skip detail

# Pre-set parameters of the model and initial conditions

| Parameter | Value/source |
|---|---|
| *Panel A - Parameters fixed from other sources* | |
| Relative risk aversion ($\gamma$) | 1.5 |
| Discount factor ($\beta$) | 0.98 |
| Childcare costs ($CC^a$) | CEX |
| Economies of scale in marriage ($\rho$) | 1.23 |

# Wage offer parameters

| Parameter | Value |
|---|---|
| *Panel A - Men* | |
| Variance of fixed effect (earnings in period 1) | 0.18 |
| Variance of earnings shocks | 0.027 |
| Life cycle profile of log earnings $(a_0^M, a_1^M, a_2^M)$ | 9.76, 0.043, -0.001 |
| *Panel B - Women* | |
| Variance of fixed effect (earnings in period 1) | 0.15 |
| Variance of earnings shocks | 0.038 |
| Life cycle profile of log earnings $(a_0^W, a_1^W, a_2^W)$ | 1.96, 0.022, -0.0003 |

# Estimated singles' distributions

- Joint distributions of assets and productivity among singles
- Allow mass on zero assets
- Conditionally, $\{\ln(A_t^M), \ln(y_t^M)\} \sim BVN(\boldsymbol{\mu}_t^M, \boldsymbol{\Sigma}_t^M)$
- Conditionally, $\{\ln(A_t^W), \ln(w_t^W)\} \sim BVN(\boldsymbol{\mu}_{ta}^W, \boldsymbol{\Sigma}_{ta}^W)$
  - Include selection correction on women's wages

# Model Parametrization

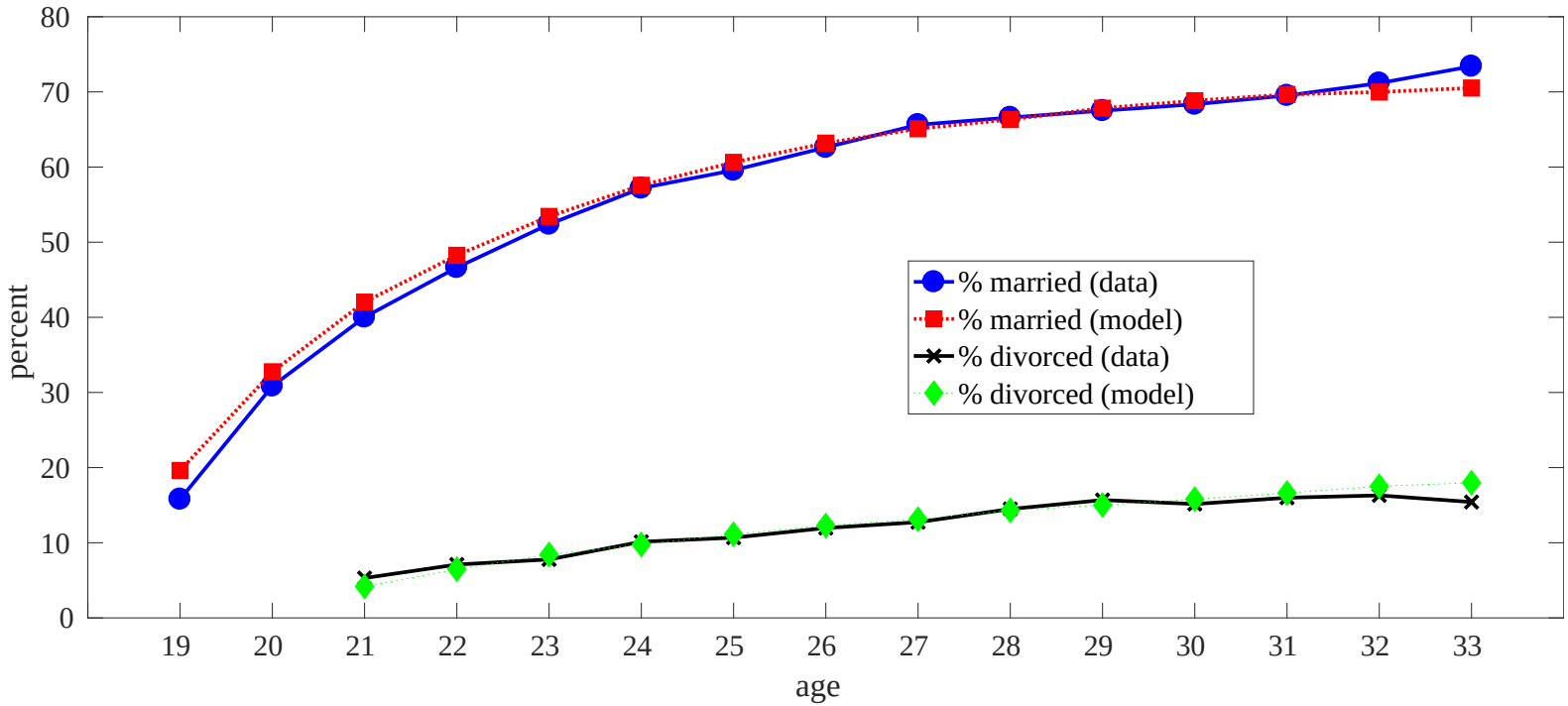
- Preferences: $u(c,P,B) = \frac{\left(c \cdot e^{\psi(M,k^a)\cdot P}\right)^{1-\gamma}}{1-\gamma} - \eta B$

- Meeting probabilities:

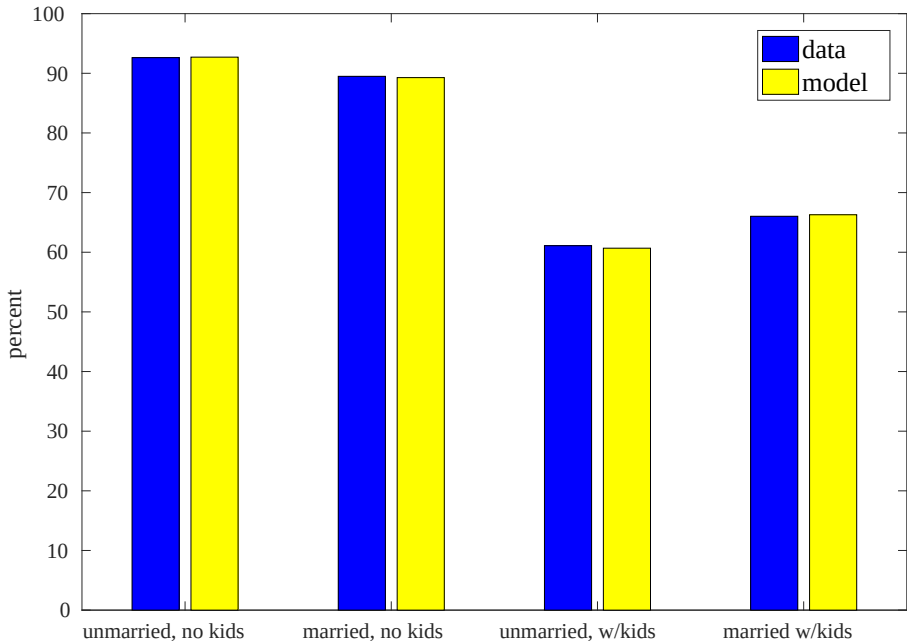
$$\lambda_t = min\{max\{\lambda_0 + \lambda_1 t + \lambda_2 t^2, 0\}, 1\}$$

- Match quality after $\tau$ years of marriage: $L^\tau = L^{\tau-1} + \xi^\tau$
  - $\xi_\tau \sim N(0, \sigma_\xi)$
  - $L^0 \sim N(0, \sigma_0)$

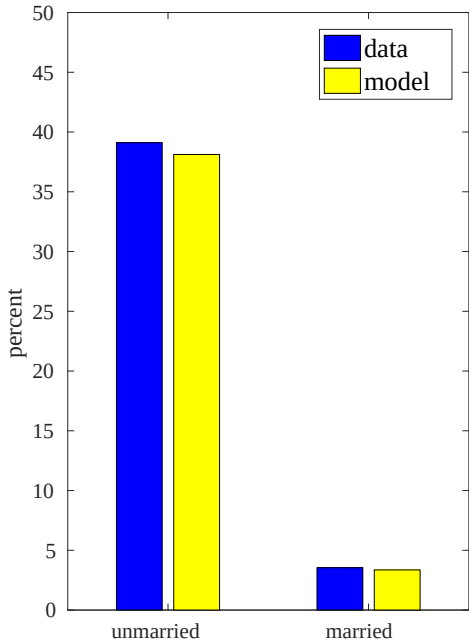
# Target moments: Marital status



# Target moments: Employment and Welfare Participation




(a) Employment moments




(b) Welfare moments

# Parameter estimates

| Parameter | | Estimate | (s.e.) |
|---|---|---|---|
| Cost of work | | | |
| Unmarried, no children | $\exp\{\psi^{s0}\}$ | 0.33 | (0.018) |
| Married, no children | $\exp\{\psi^{m0}\}$ | 0.59 | (0.012) |
| Unmarried, with child | $\exp\{\psi^{s1}\}$ | 0.43 | (0.031) |
| Married, with child | $\exp\{\psi^{m1}\}$ | 0.43 | (0.010) |
| Cost of being on AFDC | $\eta$ | 0.0018 | (0.0002) |
| Match quality | | | |
| Variance at marriage | $\sigma_0^2$ | 0.097 | (0.027) |
| Variance of innovations | $\sigma_\xi^2$ | 0.031 | (0.009) |
| Probability of meeting partner by age | $\lambda_0$ | 0.426 | (0.007) |
| | $\lambda_1$ | -0.034 | (0.002) |
| | $\lambda_2$ | 0.001 | (0.0001) |

# Simulate the Welfare Reform

Simulate the introduction of time limits, holding other features fixed

1. Simulate the transition following welfare reform
    - Validation: compare to the difference-in-differences estimates

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Simulate the introduction of time limits, holding other features fixed

1. Simulate the transition following welfare reform
   - Validation: compare to the difference-in-differences estimates

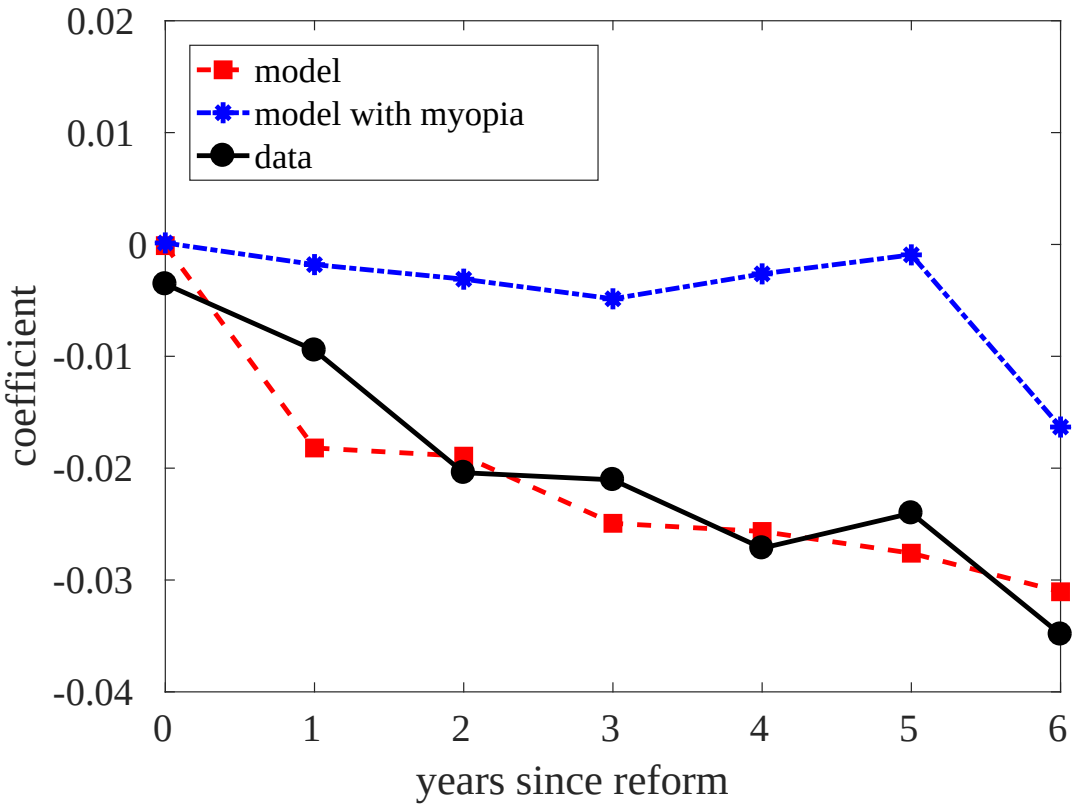
2. Compare the long-term behavior under different regimes
   - Dynamics of banking
   - Heterogeneity of effect across the productivity distribution

# Difference-in-Differences Estimates: Simulated and CPS Data

| | data | 95% c. i. | model |
|---|---|---|---|
| Welfare use, unmarried | -0.108 | [-0.131, -0.085] | -0.09 |
| Employed, unmarried | 0.085 | [0.049, 0.121] | 0.081 |
| Welfare use, married | -0.004 | [ -0.007, -0.001] | -0.009 |
| Employed, married | -0.007 | [ -0.029, 0.015] | -0.009 |
| Divorced | -0.013 | [-0.025, -0.001] | -0.004 |

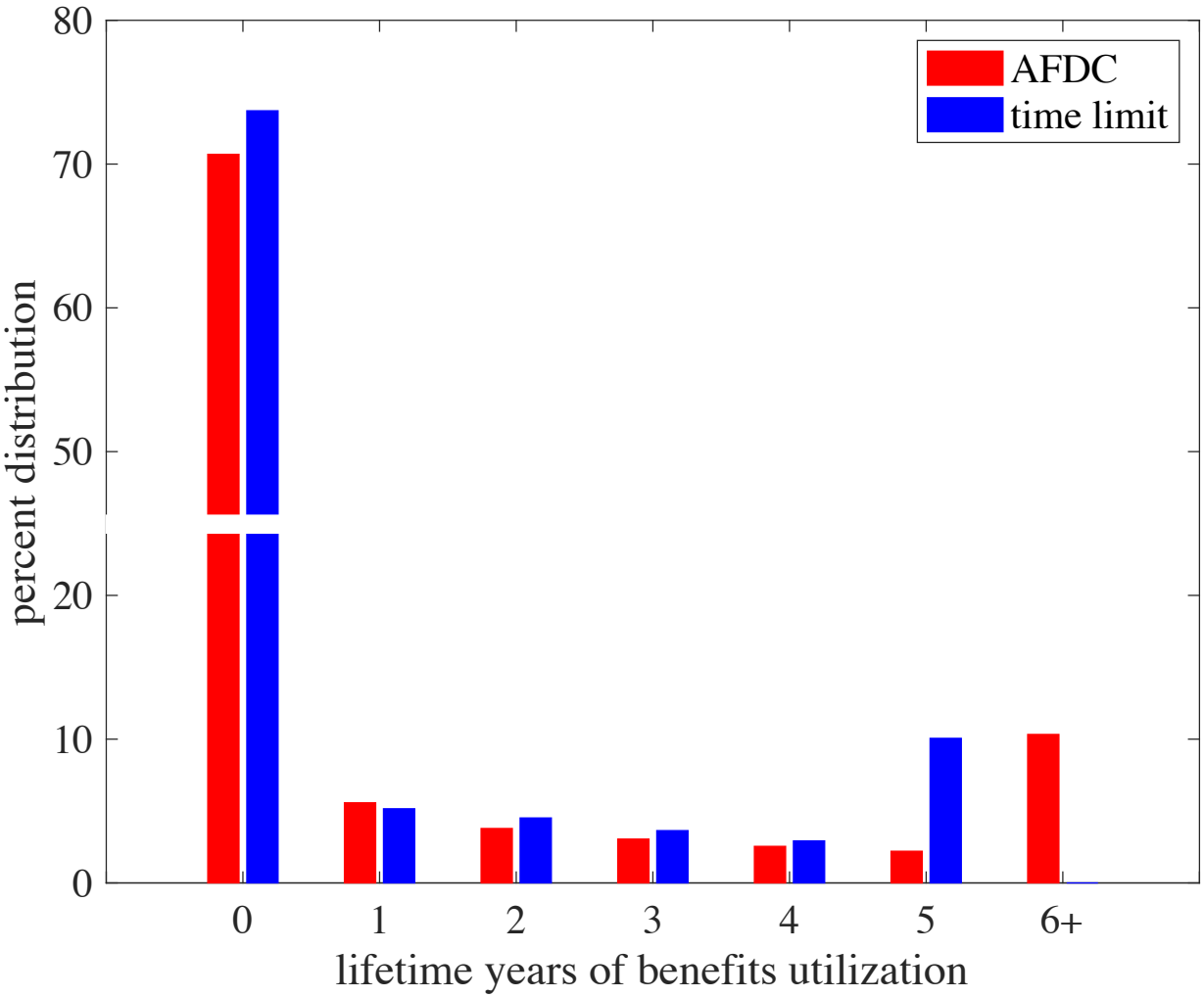
*Notes:* Estimates from the CPS data between 1990 and 2002 (first 6 years after the reform). Sample of women without college degrees, age 21 to 53.

# Dynamic response of welfare utilization to time limits for mothers

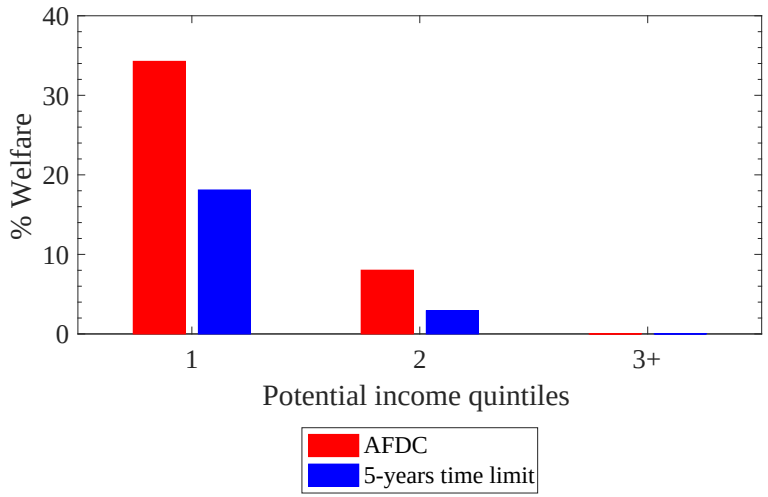



*Notes*: By *Model with myopia* we mean individuals who behave as if the introduction of time limits had not occurred (until they actually run out of benefits), but are forward looking in terms of other behavior.

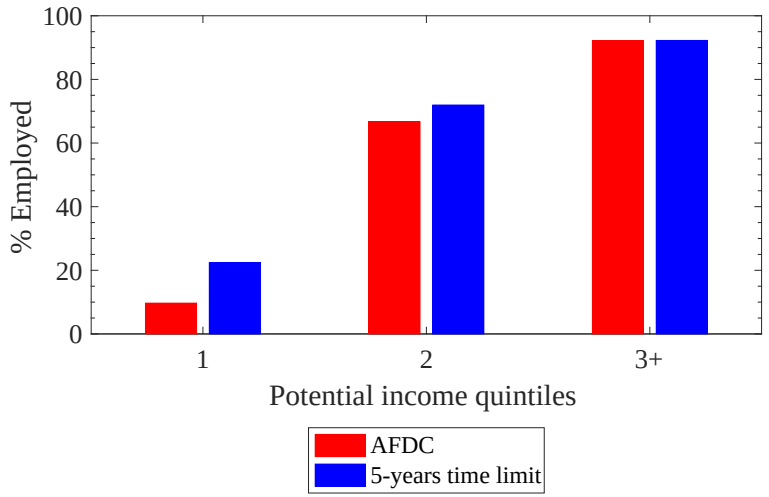
# Long-term distribution of lifetime welfare utilization



# Long-term effects of time limits on mothers' welfare use and employment



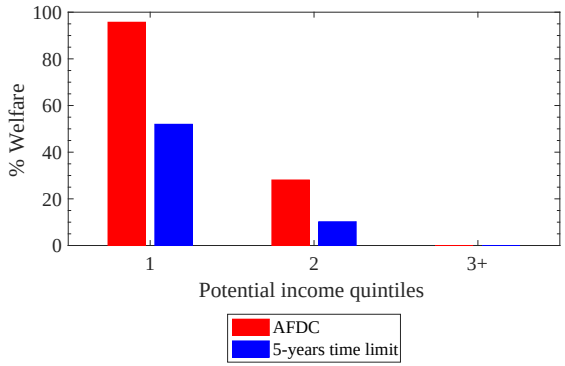

(a) Welfare use



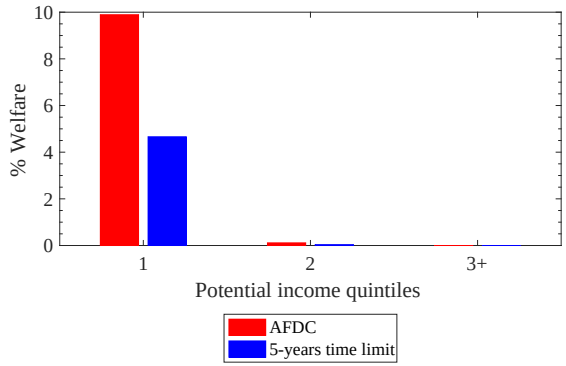

(b) Employment

*Notes:* Percentage of mothers on welfare (a) and working (b) by policy regime, by age-specific quintiles of productivity $z_{it}^{W}$.

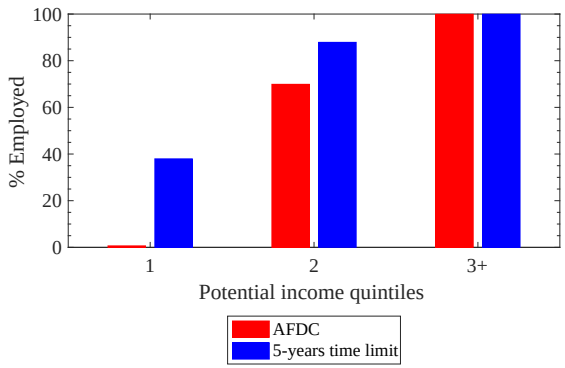
# Welfare Use and Employment of Married and Unmarried Mothers



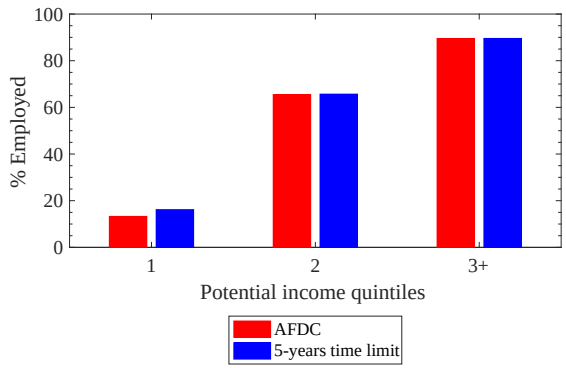

(a) Welfare use, unmarried




(b) Welfare use, married

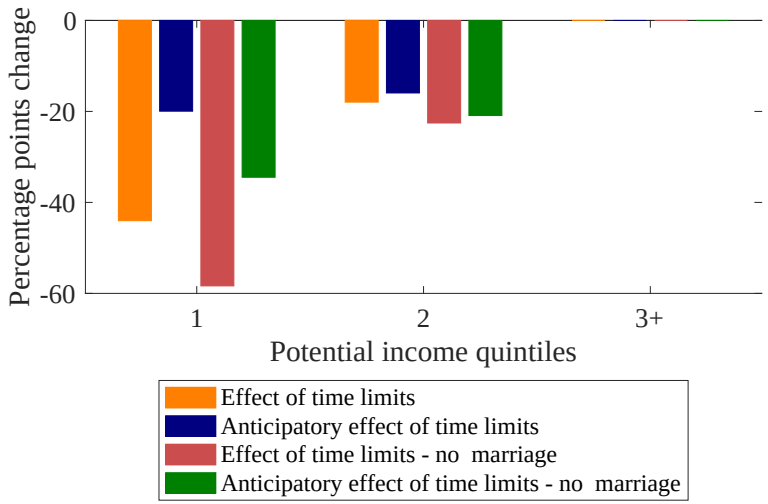



(c) Employment, unmarried

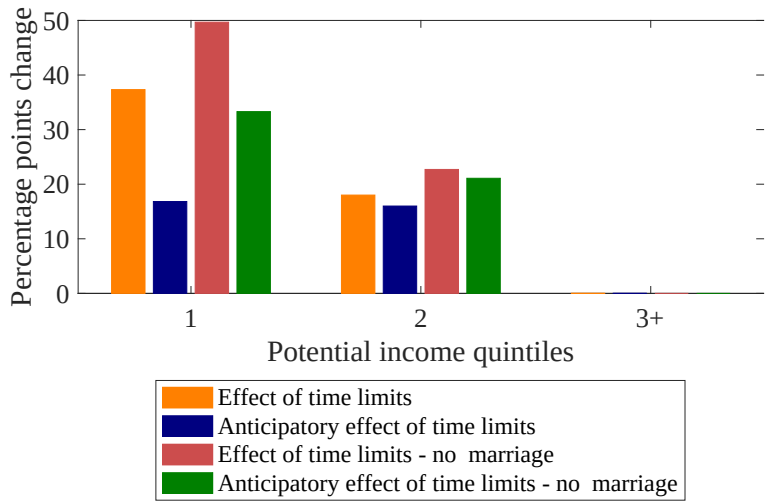



(d) Employment, married

# Long term effects of time limits on mothers
# Role of the marriage option



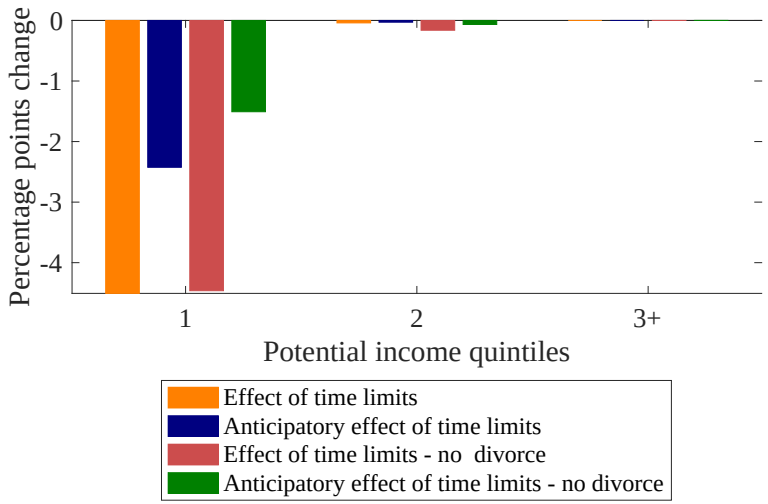

(a) Welfare use



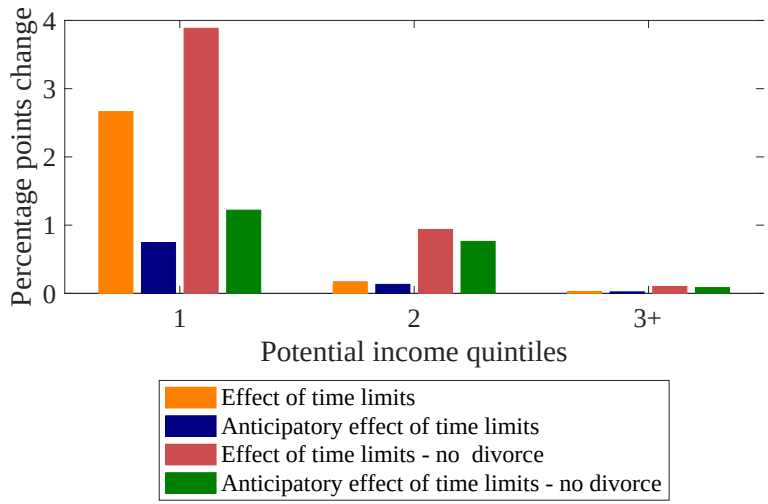

(b) Employment

*Notes:* Change in percentage of single mothers on welfare (a) and working (b) with time limits, by age-specific quintiles of productivity $z_{it}^{W}$. In the "no marriage option" counterfactual, we solve and simulate our model eliminating the possibility of marriage.

# Long term effects of time limits on mothers
# Role of the divorce option




(a) Welfare use




(b) Employment

*Notes:* Change in percentage of married mothers on welfare (a) and working (b) with time limits, by age-specific quintiles of productivity $z_{it}^{W}$. In the "no divorce" counterfactual, we solve and simulate our model eliminating the possibility of getting a divorce once married.

# Computing the welfare effects of the reform

- Consider revenue neutral policies
  - Compute government saving from time limits
  - Return the government saving to households
    - **A.** As a negative payroll tax to women
    - **B.** As a negative payroll tax to women and men

# Computing the welfare effects of the reform

- Consider revenue neutral policies
  - Compute government saving from time limits
  - Return the government saving to households
    - **A.** As a negative payroll tax to women
    - **B.** As a negative payroll tax to women and men
- Compute the consumption equivalent
  - % of lifetime consumption that makes agents indifferent between having time limits or not

$$E_0\left[U\left(s,\tau\right)\right]|_\pi = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{T-R}\beta^t\left(\frac{\left(\left(1-\pi^s\right)c_{i,t}^s\cdot e^{\psi\left(m_{i,t},k_{i,t}^a\right)\cdot P_{i,t}^s}\right)^{1-\gamma}}{1-\gamma}-\eta B_{i,t}^s+L_{i,t}m_{i,t}^s\right)$$

  - Quantify how different demographic groups are affected

# Consumption equivalent of welfare reform on women

| $\tau^W$ | Cons. Equiv. | Cons. Equiv. unmarried mothers at 25 | Cons. Equiv. married mothers at 25 | Cons. Equiv. non-mothers at 25 |
|---|---|---|---|---|
| no neutrality | 0.74% | 2.33% | 1.76% | 0.28% |
| neutrality (-0.375%) | 0.54% | 2.19% | 1.56% | 0.06% |

Consumption Equivalent is the willingness to pay to remain at baseline - A positive number is a decline in welfare relative to baseline

# Consumption equivalent of welfare reform on women

## The importance of the marriage option

| marriage option | $\tau^W$ | Cons. Equiv. | Cons. Equiv. unmarried mothers at 25 | Cons. Equiv. married mothers at 25 | Cons. Equiv. non-mothers at 25 |
|---|---|---|---|---|---|
| yes | -0.375% | 0.54% | 2.19% | 1.56% | 0.06% |
| no | -0.975% | 0.80% | 2.91% | - | -0.19% |
| limited | -0.5% | 0.67% | 2.68% | 0.93% | 0.09% |

*Notes:* **Cons. Equivalent** is the willingness to pay to remain at baseline - A positive number is a decline in welfare relative to baseline.

The **limited marriage option** counterfactual considers a decline in the probability of meeting a potential partner that can reduce lifetime marriage probability by 10 percentage points, in line with what observe for the more recent birth cohorts.

# Consumption equivalent of welfare reform on both men and women

| $\tau$ | Cons. Equiv. for women | Cons. Equiv. for men | Cons. Equiv. on average |
|---|---|---|---|
| no neutrality | 0.74% | $\sim$ 0% | 0.35% |
| neutrality (-0.112%) | 0.68% | -0.07% | 0.31% |

Consumption Equivalent is the willingness to pay to remain at baseline - A positive number is a decline in welfare relative to baseline

# Welfare effects of alternative reforms

- Consider revenue neutral policies to time limits
  - Hold the negative payroll tax fixed
- No time limits, but a reduction in amount of benefits paid
  - Benefits reduced by 38%
- Compute the consumption equivalent
  - Fraction of lifetime consumption that makes agents indifferent between having time limits or less generous benefits is -0.11%: Even a reduction of welfare benefits of this magnitude is preferred to time limits.

# Conclusions

- Time limits affect the lowest quintile of productivity the most
- Marriage and divorce influence the impact of time limits
  - Especially in the lowest quintile of productivity
- This influence is partly anticipatory and due to expectations
- As single-headed homes become more common, the social cost of welfare reforms is likely to raise drastically

# Men's earnings process

$$E[\Delta u_t^2] = \sigma_\zeta^2 + 2\sigma_\varepsilon^2$$
$$E[\Delta u_t \Delta u_{t-1}] = -\sigma_\varepsilon^2$$

Back

# Women's wage process

$$E[\Delta u_t \mid P_t = 1, P_{t-1} = 1] = \sigma_{\zeta_W \eta} \left[ \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \right]$$

$$E[\Delta u_t^2 \mid P_t = 1, P_{t-1} = 1] = \sigma_{\zeta W}^2 + \sigma_{\zeta_W \eta}^2 \left[ \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \alpha_t \right] + 2\sigma_{\varepsilon W}^2$$

$$E[\Delta u_t \Delta u_{t-1} \mid P_t = 1, P_{t-1} = 1, P_{t-2} = 1] = -\sigma_{\varepsilon W}^2$$

▸ Back

# Outcomes of women with children above age five

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | SIPP | | | |
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.026*** | -0.064*** | -0.000 | 0.036** | -0.032*** | 0.008 |
| | (0.004) | (0.015) | (0.012) | (0.015) | (0.009) | (0.011) |
| Mean pre-reform | 0.065 | 0.189 | 0.713 | 0.716 | 0.180 | 0.746 |
| Obs | 189,950 | 54,296 | 189,950 | 54,296 | 189,950 | 189,950 |
| $R^2$ | 0.08 | 0.20 | 0.09 | 0.16 | 0.03 | 0.07 |
| | | | CPS | | | |
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.011*** | -0.055*** | -0.012 | 0.034 | -0.003 | -0.018** |
| | (0.002) | (0.009) | (0.010) | (0.023) | (0.006) | (0.007) |
| Mean pre-reform | 0.055 | 0.202 | 0.715 | 0.706 | 0.157 | 0.774 |
| Obs | 91,826 | 21,643 | 91,826 | 21,643 | 91,826 | 91,826 |
| $R^2$ | 0.05 | 0.14 | 0.06 | 0.13 | 0.02 | 0.05 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

▸ Back

# OLS Regressions with First Wave of Each SIPP panel

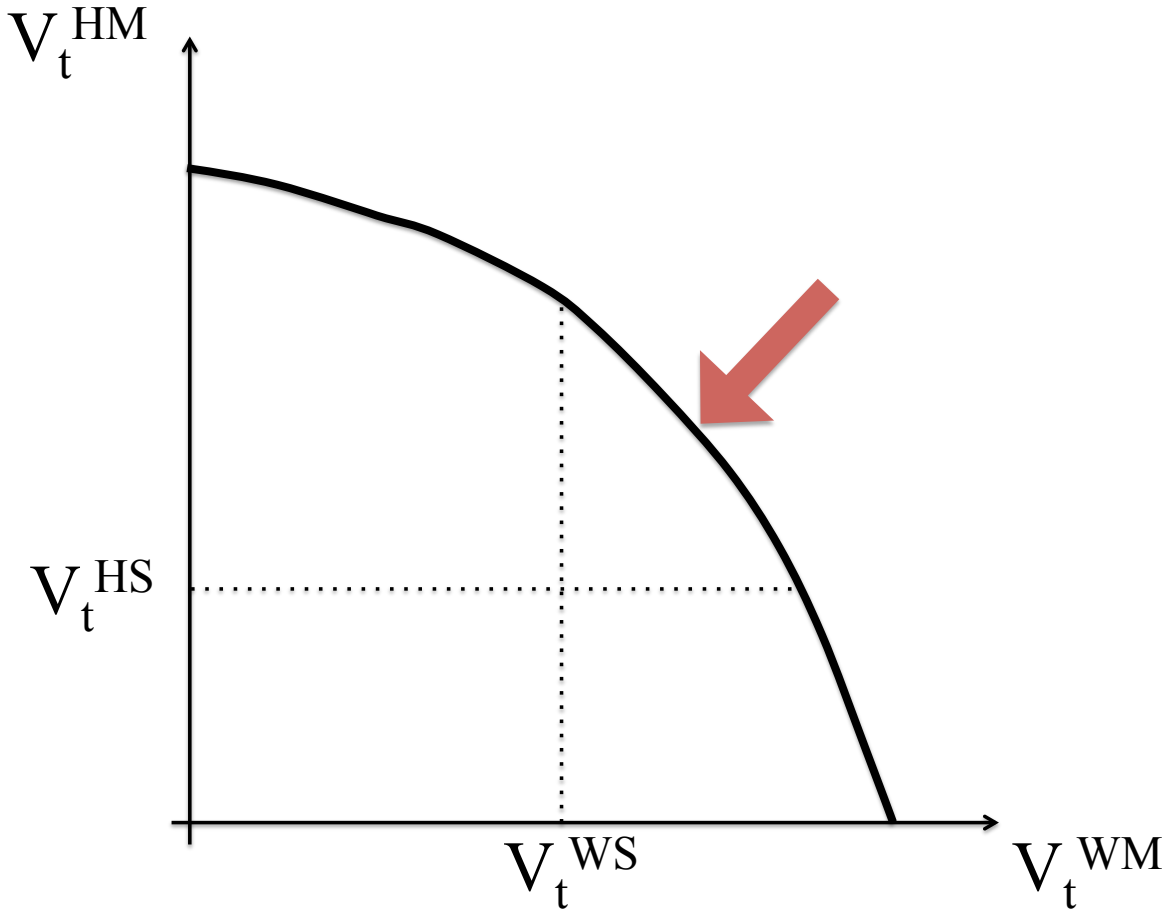
| Dependent Var: | **AFDC/TANF** | | SIPP **Employed** | | **Div/Sep** | **Married** |
|---|---|---|---|---|---|---|
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.049*** | -0.153*** | 0.033** | 0.114*** | -0.031** | -0.027** |
| | (0.006) | (0.016) | (0.013) | (0.036) | (0.012) | (0.013) |
| Mean pre-reform | 0.097 | 0.289 | 0.637 | 0.629 | 0.154 | 0.746 |
| Obs | 41,262 | 11,605 | 41,262 | 11,605 | 41,262 | 41,262 |
| $R^2$ | 0.13 | 0.32 | 0.14 | 0.26 | 0.05 | 0.07 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels.

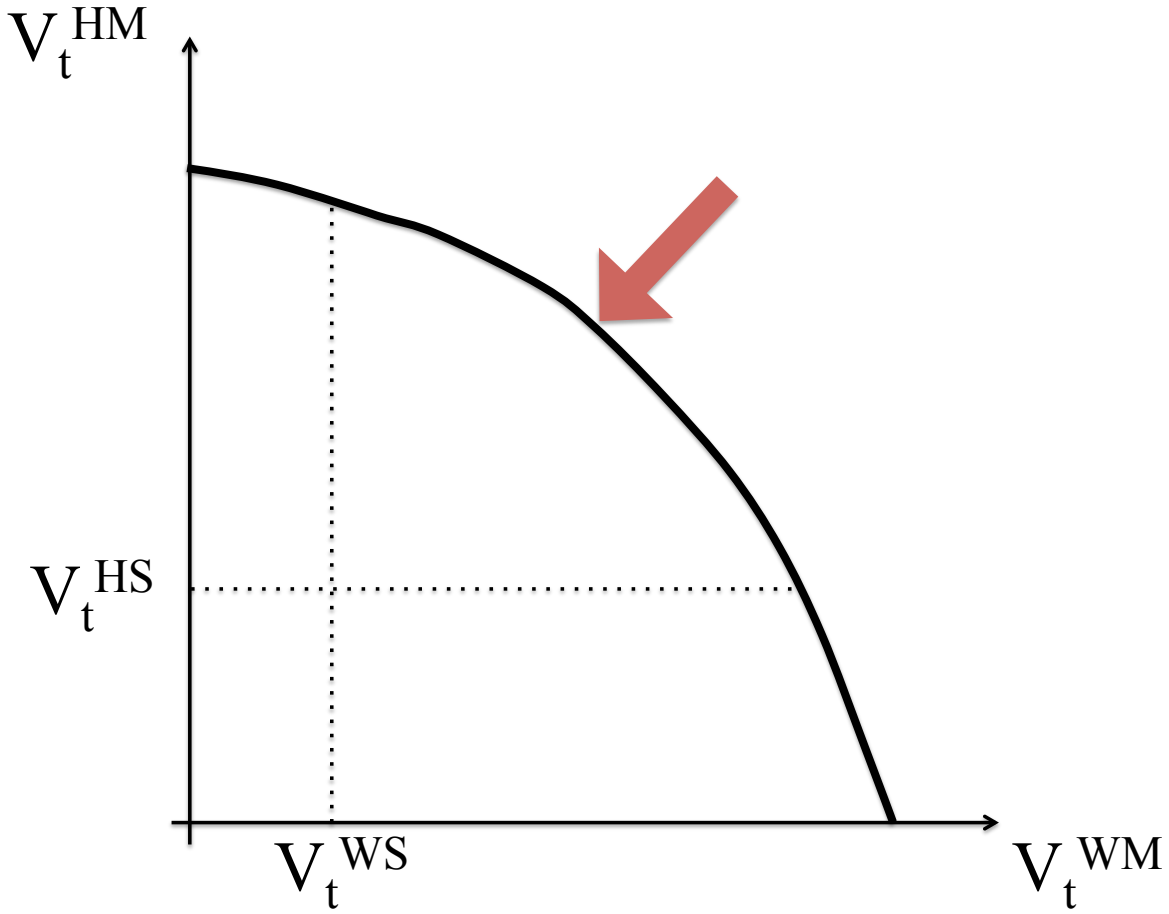
# Summary statistics

| | Regression Sample | | Pre-reform | | Post-reform | |
|---|---|---|---|---|---|---|
| | SIPP | CPS | SIPP | CPS | SIPP | CPS |
| On Welfare | 0.086 | 0.063 | 0.101 | 0.077 | 0.040 | 0.040 |
| On Welfare (married) | 0.029 | 0.015 | 0.034 | 0.019 | 0.014 | 0.010 |
| On Welfare (unmarr.) | 0.253 | 0.240 | 0.306 | 0.304 | 0.108 | 0.148 |
| Employed | 0.650 | 0.666 | 0.642 | 0.647 | 0.674 | 0.694 |
| Employed (married) | 0.650 | 0.666 | 0.647 | 0.654 | 0.659 | 0.685 |
| Employed (unmarr.) | 0.648 | 0.664 | 0.624 | 0.620 | 0.712 | 0.726 |
| Divorced or separated | 0.152 | 0.125 | 0.151 | 0.126 | 0.154 | 0.124 |
| Div/sep if $m_{t-1} = 1$ | 0.009 | 0.013 | 0.009 | 0.014 | 0.009 | 0.013 |
| Married | 0.745 | 0.789 | 0.753 | 0.796 | 0.720 | 0.780 |
| Married if $m_{t-1} = 0$ | 0.025 | 0.047 | 0.025 | 0.047 | 0.025 | 0.047 |
| Less than high school | 0.172 | 0.245 | 0.171 | 0.311 | 0.174 | 0.142 |
| High school | 0.491 | 0.377 | 0.493 | 0.337 | 0.484 | 0.438 |
| Some college | 0.337 | 0.378 | 0.336 | 0.352 | 0.343 | 0.420 |
| White | 0.805 | 0.833 | 0.810 | 0.835 | 0.790 | 0.831 |
| Age | 36.035 | 36.256 | 35.837 | 35.921 | 36.653 | 36.780 |
| Number of children | 1.991 | 2.113 | 1.992 | 2.111 | 1.988 | 2.118 |
| Age of youngest | 7.248 | 7.562 | 7.163 | 7.436 | 7.515 | 7.759 |
| $Exposed_{dst}Post_{st}$ | 0.181 | 0.287 | 0.000 | 0.000 | 0.745 | 0.736 |
| N. of Obs. | 254,627 | 112,128 | 171,062 | 68,353 | 83,565 | 43,775 |

# What determines the Pareto weight?



# What determines the Pareto weight? (cont.)



# Women's wages: selection correction

$$Pr(P_{ist}^{W} = 1|Z, X) = \Phi\left(\gamma' Z_{st}^{W} + \beta' X_{it}^{W}\right)$$

| VARIABLES | (1) coeff. | (2) marg. eff. |
|---|---|---|
| Average AFDC payment ($100) | -0.064*** | -0.021*** |
| | (0.007) | (0.003) |
| Average food stamps payment ($100) | -0.002 | -0.008 |
| | (0.095) | (0.031) |
| Average EITC payment ($100) | 0.183*** | 0.060*** |
| | (0.054) | (0.018) |
| Age dummies | Yes | |
| State dummies | Yes | |
| Year dummies | Yes | |
| Controls | Yes | |
| Observations | 69,832 | |

# Estimated singles' distributions

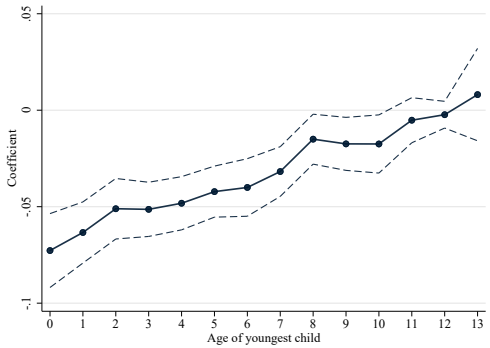
- Joint distributions of assets and productivity among singles
- Allow mass on zero assets and earnings for men
- Conditionally, $\{ln(A_t^M), ln(y_t^M)\} \sim BVN(\boldsymbol{\mu}_t^M, \boldsymbol{\Sigma}_t^M)$
- Conditionally, $\{ln(A_t^W), ln(y_t^W)\} \sim BVN(\boldsymbol{\mu}_{ta}^W, \boldsymbol{\Sigma}_{ta}^W)$
  - Include selection correction

# Joint Employment and Welfare Utilization Status of Single Mothers

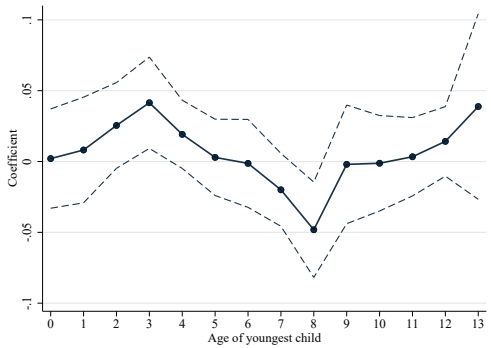
| | | | | |
|---|---|---|---|---|
| | | SIPP | | |
| Dependent Var: | Employed On Welfare | Employed Not on Welfare | Not Employed On Welfare | Not Employed Not on Welfare |
| $Exposed_{dst}Post_{st}$ | -0.029*** | 0.084*** | -0.080*** | 0.024* |
| | (0.005) | (0.015) | (0.011) | (0.014) |
| Mean pre-reform | 0.062 | 0.570 | 0.231 | 0.137 |
| Obs | 93,304 | 93,304 | 93,304 | 93,304 |
| $R^2$ | 0.07 | 0.21 | 0.24 | 0.10 |
| | | CPS | | |
| Dependent Var: | Employed On Welfare | Employed Not on Welfare | Not Employed On Welfare | Not Employed Not on Welfare |
| $Exposed_{dst}Post_{st}$ | -0.011 | 0.064*** | -0.100*** | 0.047** |
| | (0.008) | (0.019) | (0.010) | (0.021) |
| Mean pre-reform | 0.066 | 0.557 | 0.232 | 0.145 |
| Obs | 33,593 | 33,593 | 33,593 | 33,593 |
| $R^2$ | 0.04 | 0.13 | 0.15 | 0.06 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

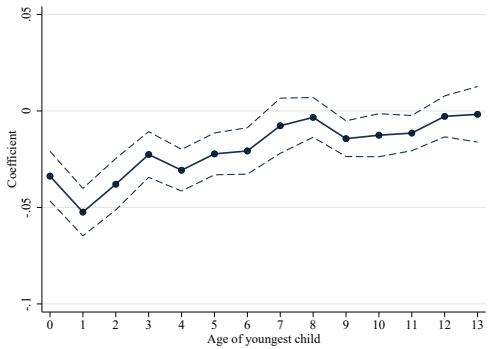
# Program Participation and Employment Dynamics by Child Age



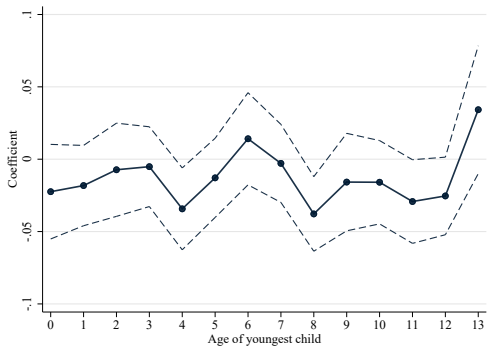

(a) SIPP: Program participation




(b) SIPP: Employment




(c) CPS: Program participation




(d) CPS: Employment

*Notes:* Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# OLS Regressions Including Age-by-Year Fixed Effects

| | SIPP | | | | | |
|---|---|---|---|---|---|---|
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.033*** | -0.068*** | -0.004 | 0.012 | -0.022** | 0.018* |
| | (0.004) | (0.015) | (0.011) | (0.016) | (0.010) | (0.011) |
| Mean pre-reform | 0.098 | 0.293 | 0.641 | 0.632 | 0.151 | 0.756 |
| Obs | 336,129 | 93,304 | 336,129 | 93,304 | 336,129 | 336,129 |
| $R^2$ | 0.12 | 0.28 | 0.12 | 0.20 | 0.03 | 0.06 |
| | CPS | | | | | |
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.004 | -0.035*** | -0.009 | 0.018 | 0.001 | 0.000 |
| | (0.003) | (0.012) | (0.008) | (0.022) | (0.007) | (0.008) |
| Mean pre-reform | 0.077 | 0.298 | 0.648 | 0.623 | 0.126 | 0.793 |
| Obs | 153,498 | 33,593 | 153,498 | 33,593 | 153,498 | 153,498 |
| $R^2$ | 0.08 | 0.18 | 0.06 | 0.14 | 0.02 | 0.05 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# SIPP sample selection

Data from 1990-2008 panels, most recent observation for each wave (to avoid "seam effect")

| | individuals | observations |
|---|---|---|
| Everyone over 18 | 481,327 | 3,306,878 |
| Drop college graduates | 303,033 | 1,996,570 |
| Drop men | 163,500 | 1,097,432 |
| Drop over 60 | 123,994 | 784,791 |
| Drop if no children in household | 75,938 | 455,514 |
| Household heads or spouses | 64,739 | 406,370 |

# Effects of Time Limits on College Graduates

| | | | | | | |
|---|---|---|---|---|---|---|
| | SIPP | | | | | |
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.008*** | -0.067*** | -0.010 | 0.005 | -0.002 | -0.013 |
| | (0.002) | (0.015) | (0.012) | (0.020) | (0.014) | (0.015) |
| Mean pre-reform | 0.010 | 0.050 | 0.772 | 0.895 | 0.094 | 0.875 |
| Obs | 141,336 | 19,348 | 141,336 | 19,348 | 141,336 | 141,336 |
| $R^2$ | 0.03 | 0.23 | 0.08 | 0.19 | 0.08 | 0.09 |
| | CPS | | | | | |
| Dependent Var: | **AFDC/TANF** | | **Employed** | | **Div/Sep** | **Married** |
| Sample: | Whole | Unmarried | Whole | Unmarried | Whole | Whole |
| $Exposed_{dst}Post_{st}$ | -0.003** | -0.032*** | -0.013 | -0.004 | 0.001 | -0.006 |
| | (0.001) | (0.011) | (0.010) | (0.027) | (0.011) | (0.013) |
| Mean pre-reform | 0.005 | 0.035 | 0.775 | 0.905 | 0.078 | 0.899 |
| Obs | 55,591 | 5,681 | 55,591 | 5,681 | 55,591 | 55,591 |
| $R^2$ | 0.02 | 0.18 | 0.04 | 0.19 | 0.02 | 0.03 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Marital Status Transitions

| Dependent Var: | **Gets married** | | **Gets married** | |
|---|---|---|---|---|
| Sample: | $m_{t-1}=0,\ d_{t-1}=0$ | | $m_{t-1}=1,\ d_{t-1}=1$ | |
| | SIPP | CPS | SIPP | CPS |
| $Exposed_{dst}Post_{st}$ | 0.001 | -0.000 | 0.001 | -0.020 |
| | (0.005) | (0.001) | (0.004) | (0.019) |
| Mean pre-reform | 0.017 | 0.003 | 0.030 | 0.052 |
| Obs | 33,102 | 58,540 | 44,387 | 8,145 |
| $R^2$ | 0.10 | 0.02 | 0.06 | 0.13 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Fertility

| Dependent Var: | **Newborn in $t+1$** | | | | | |
|---|---|---|---|---|---|---|
| Sample: | Whole | | Married | | Unmarried | |
| | SIPP | CPS | SIPP | CPS | SIPP | CPS |
| $Exposed_{dst}Post_{st}$ | -0.002 | -0.001 | -0.003 | -0.000 | 0.004 | 0.006 |
| | (0.002) | (0.003) | (0.002) | (0.003) | (0.003) | (0.007) |
| Mean pre-reform | 0.072 | 0.049 | 0.075 | 0.051 | 0.065 | 0.039 |
| Obs | 198,657 | 66,685 | 145,256 | 52,528 | 53,401 | 14,157 |
| $R^2$ | 0.42 | 0.04 | 0.42 | 0.06 | 0.43 | 0.09 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

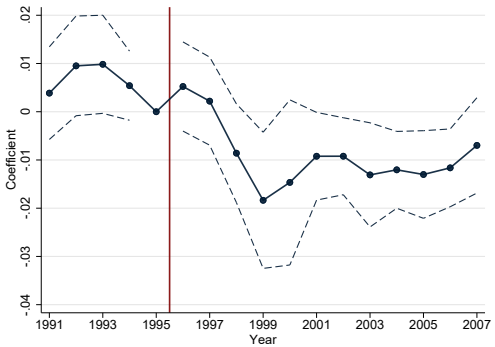
# Food Stamps Utilization

| | SIPP | | |
|---|---|---|---|
| Dependent Var: | **Food Stamps Utilization** | | |
| Sample: | Whole | Married | Unmarried |
| $Exposed_{dst}Post_{st}$ | -0.011 | -0.007 | -0.041*** |
| | (0.008) | (0.006) | (0.014) |
| Mean pre-reform | 0.156 | 0.077 | 0.401 |
| Obs | 336,129 | 242,825 | 93,304 |
| $R^2$ | 0.14 | 0.12 | 0.23 |

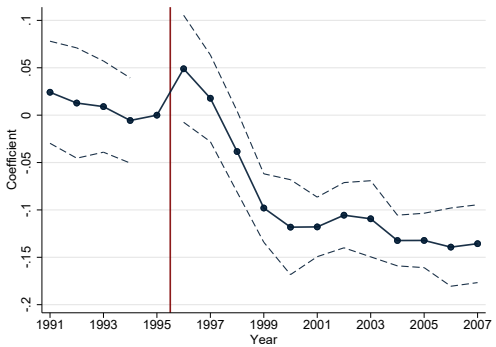
*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels.

# Program Participation Dynamics

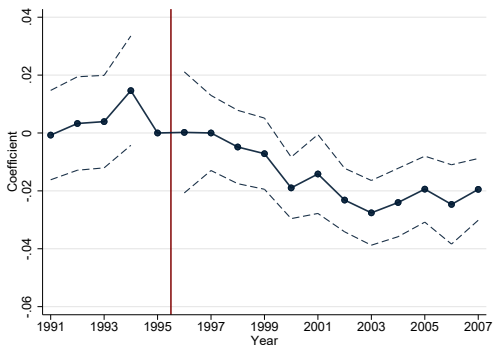

(a) SIPP: Everyone



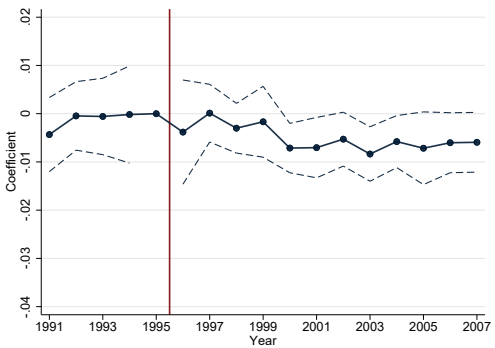

(b) SIPP: Married




(c) SIPP: Single




(d) CPS: Everyone

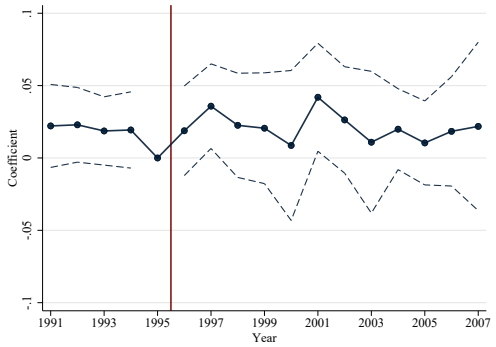



(e) CPS: Married

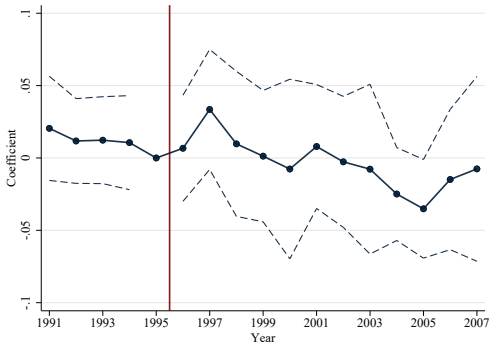

(f) CPS: Single

*Notes:* Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

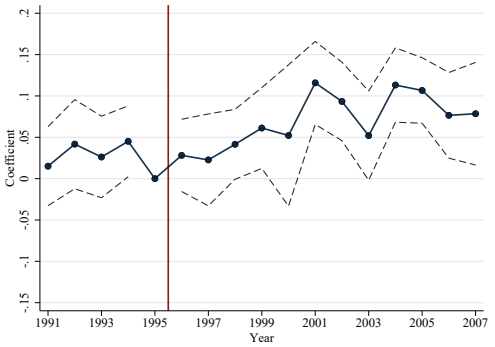
# Employment Dynamics



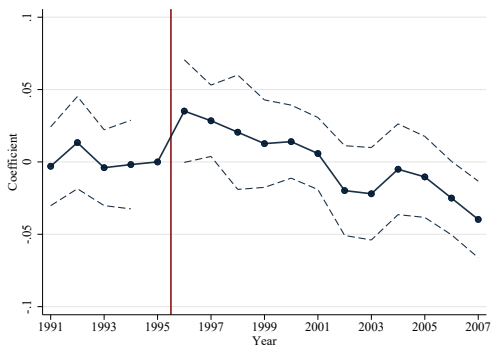

(a) SIPP: Everyone




(b) SIPP: Married

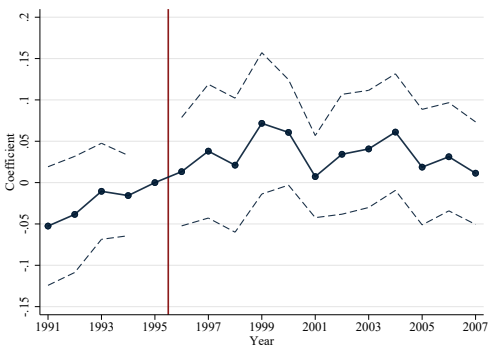



(c) SIPP: Single




(d) CPS: Everyone

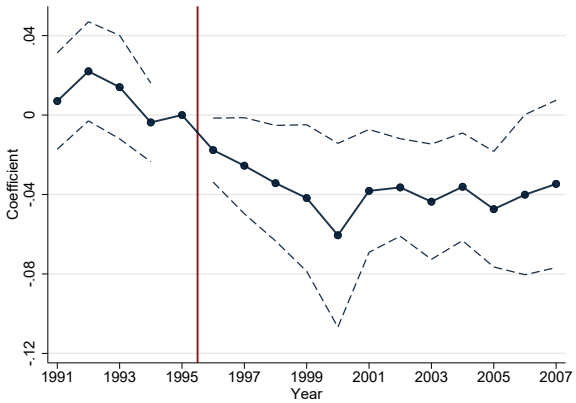

(e) CPS: Married



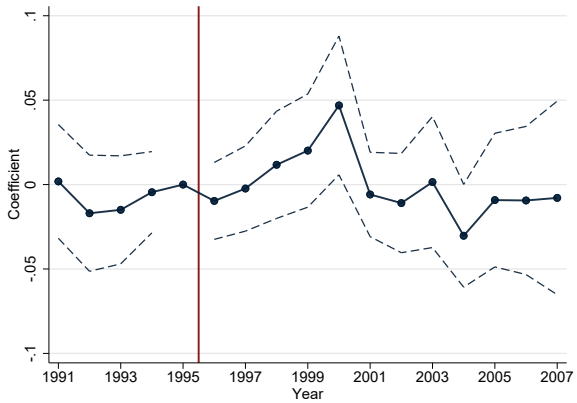

(f) CPS: Single

*Notes:* Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Marital Status Dynamics

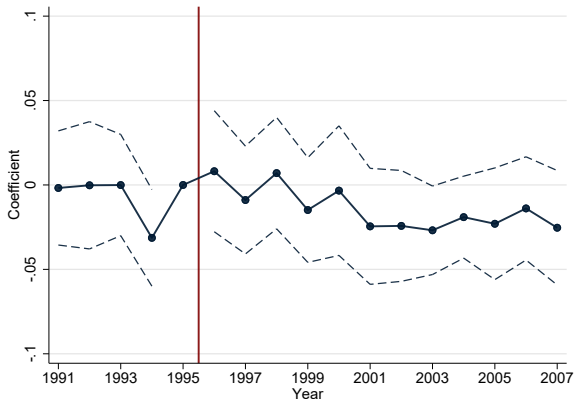



(a) SIPP: Divorce/Separation




(b) SIPP: Marriage

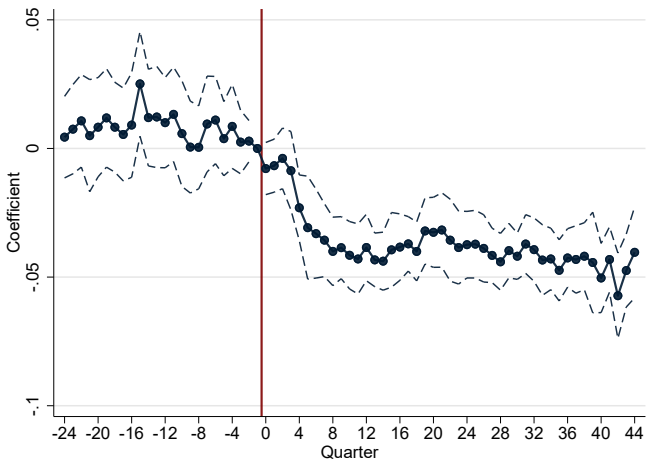

(c) CPS: Divorce/Separation



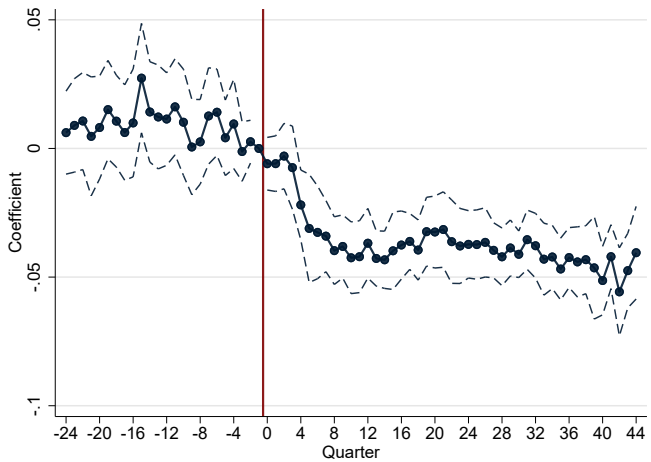

(d) CPS: Marriage

*Notes:* Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Program Participation following the Introduction of Time Limits



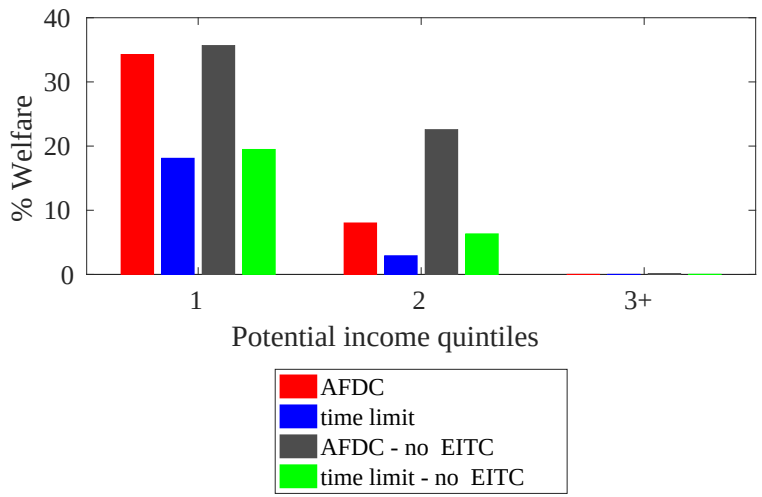

(a) Full sample



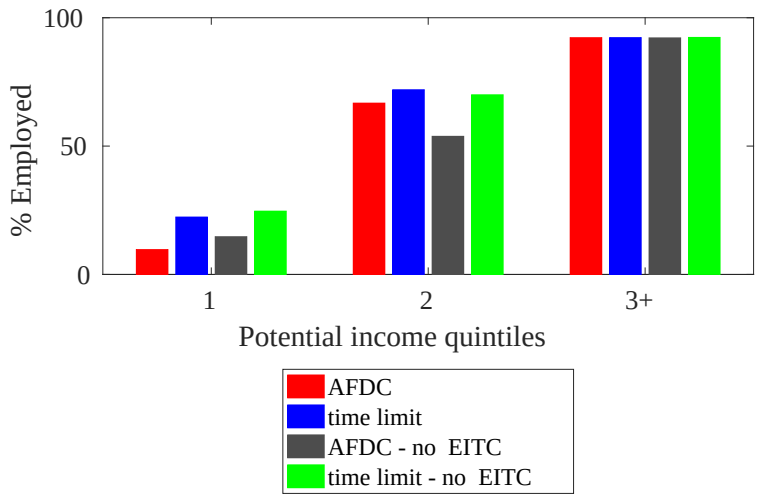

(b) Time limits above 24 months

*Notes:* Data from the 1990-2004 SIPP panels.

# Welfare Use and Employment with and without EITC

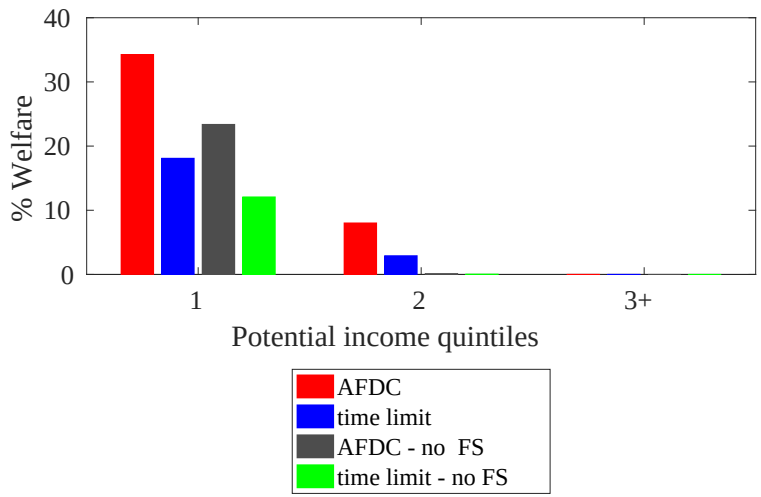



(a) Welfare use

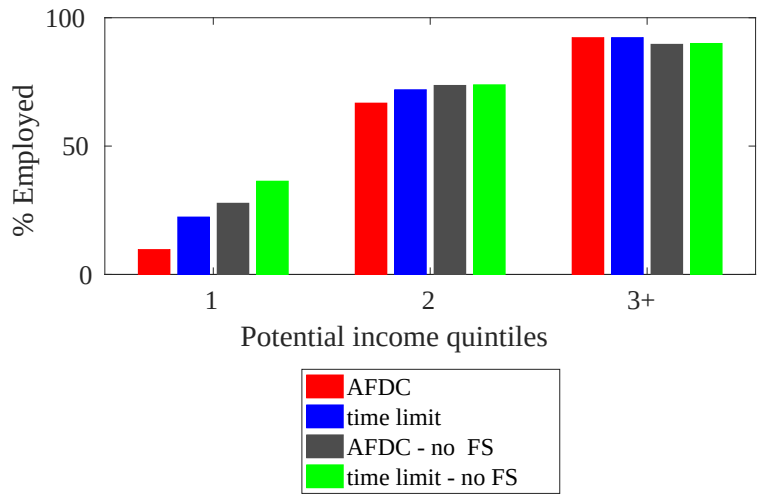



(b) Employment

# Welfare Use and Employment of Mothers with and without Food Stamps

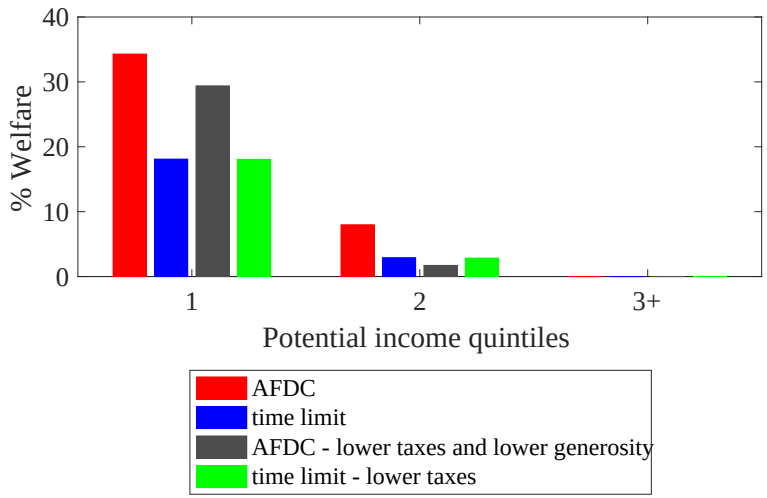



(a) Welfare use

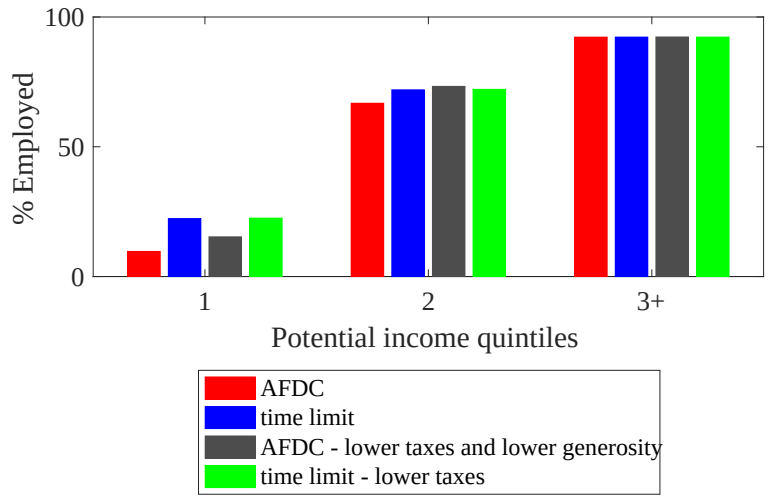



(b) Employment

# Welfare Use and Employment with reduced generosity




(a) Welfare use




(b) Employment

# Welfare use and the Role of the Marriage Market

| Marriage option | Time limits | $\tau$ | Benefit use | Benefit use by mothers | Benefit use by married mothers | Benefit use by single mothers |
|---|---|---|---|---|---|---|
| yes | no | 0.00% | 4.96% | 11.47% | 2.71% | 34.84% |
| no | no | 0.00% | 9.94% | 34.53% | | 34.53% |
| yes | yes | -0.375% | 2.48% | 5.72% | 1.29% | 17.55% |
| no | yes | -0.975% | 3.33% | 11.55% | | 11.55% |

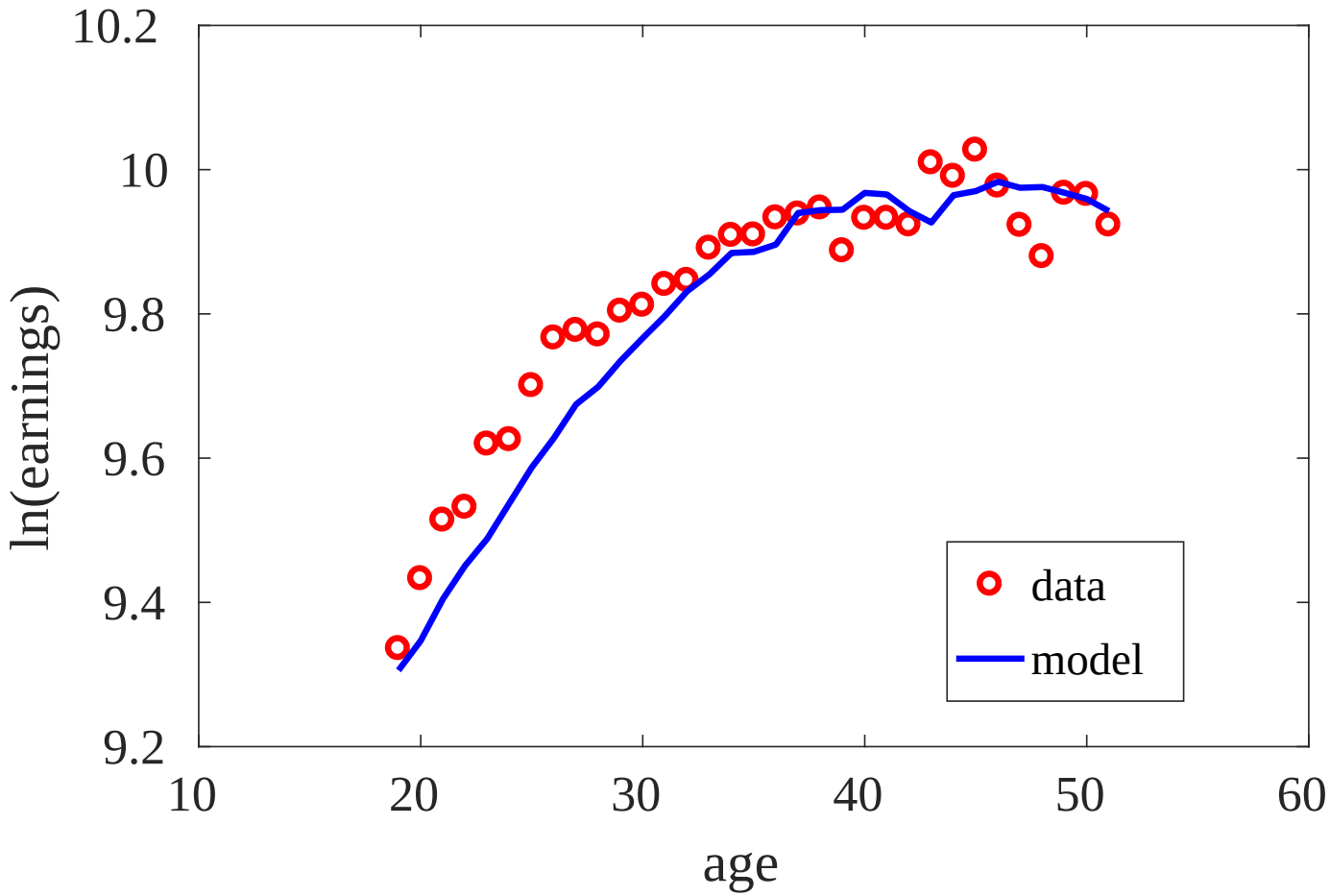
# Welfare use

| Marriage option | Time limits | $\tau$ | Benefits use | Benefits use by mothers | Benefits by married mothers | Benefits use by single mothers |
|---|---|---|---|---|---|---|
| yes | no | 0.00% | 4.96% | 11.47% | 2.71% | 34.84% |
| no | no | 0.00% | 9.94% | 34.53% | | 34.53% |
| yes | yes | 0.00% | 2.49% | 5.75% | 1.29% | 17.65% |
| no | yes | 0.00% | 3.37% | 11.71% | | 11.71% |
| yes | yes | -0.375% | 2.48% | 5.72% | 1.29% | 17.55% |
| no | yes | -0.975% | 3.33% | 11.55% | | 11.55% |

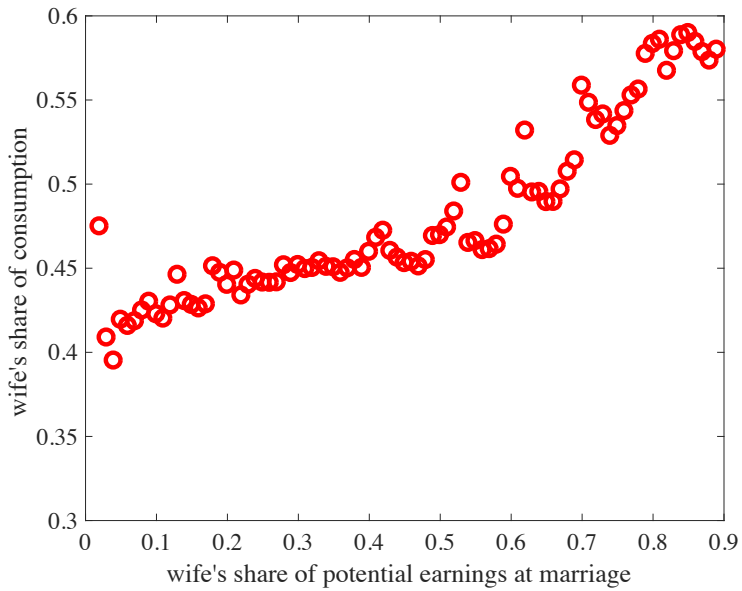
# Welfare use

| Time limits | $\tau$ | Benefit use | Benefit use by mothers | Benefit use by married mothers | Benefit use by single mothers |
|---|---|---|---|---|---|
| no | 0.00% | 4.96% | 11.47% | 2.71% | 34.84% |
| yes | 0.00% | 2.49% | 5.75% | 1.29% | 17.65% |
| yes | -0.375% | 2.48% | 5.72% | 1.29% | 17.55% |

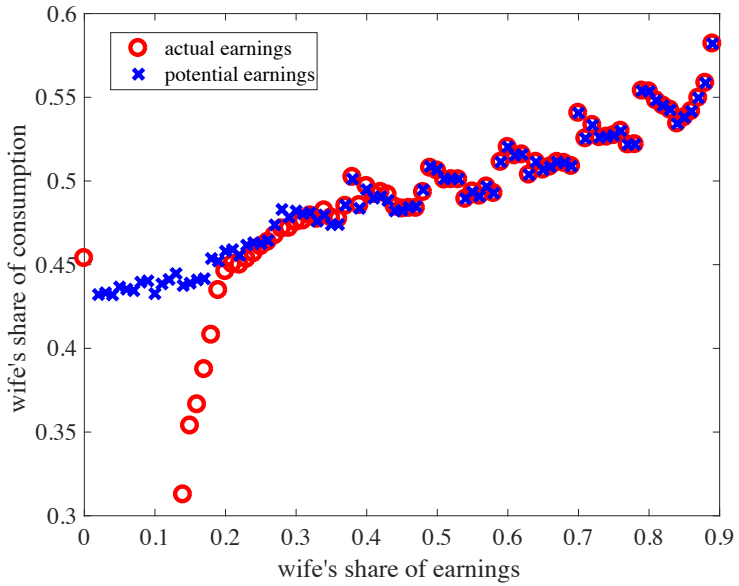
# Validation: Fit of single women's log-earnings



# Implications: Intra-household allocation

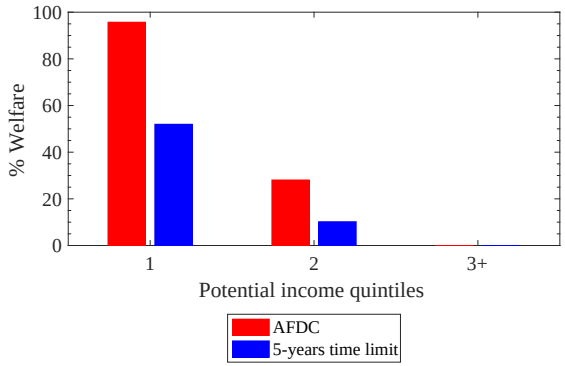



(a) Offer wages at marriage

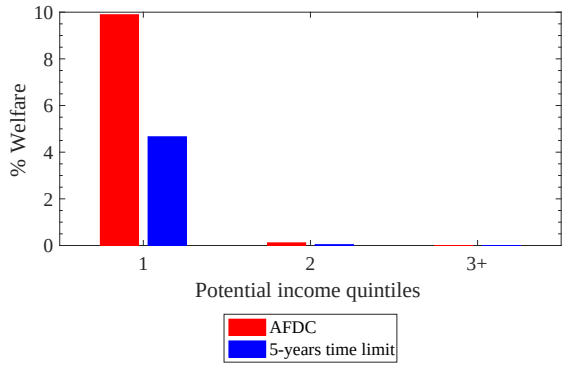



(b) Offer wages

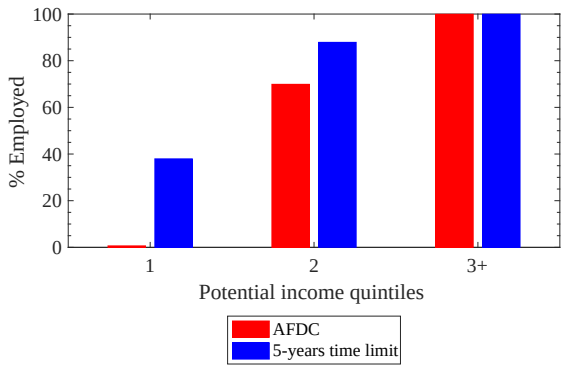
# Welfare Use and Employment of Married and Unmarried Mothers



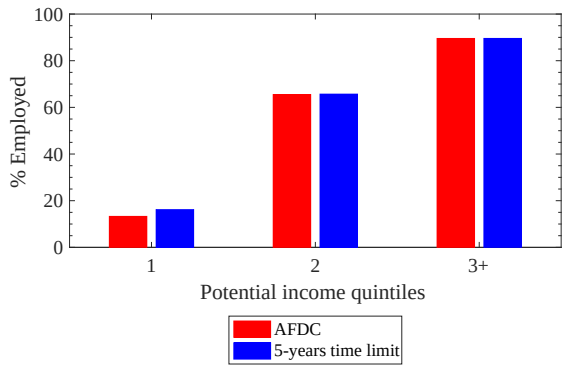

(a) Welfare use, unmarried




(b) Welfare use, married




(c) Employment, unmarried




(d) Employment, married

# Welfare Utilization

| Dependent Var: | **AFDC/TANF Utilization** | | |
|---|---|---|---|
| Sample: | Whole | Married | Unmarried |
| $Exposed_{dst}Post_{st}$ | -0.038*** | -0.013*** | -0.108*** |
| | (0.004) | (0.002) | (0.012) |
| Mean pre-reform | 0.098 | 0.035 | 0.293 |
| Obs | 336,129 | 242,825 | 93,304 |
| $R^2$ | 0.11 | 0.07 | 0.27 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS. ▸ No child care

# Employment

| Dependent Var: | **Employment** | | |
|---|---|---|---|
| Sample: | Whole | Married | Unmarried |
| $Exposed_{dst}Post_{st}$ | 0.007 | -0.014 | 0.055*** |
| | (0.011) | (0.014) | (0.013) |
| Mean pre-reform | 0.641 | 0.644 | 0.632 |
| Obs | 336,129 | 242,825 | 93,304 |
| $R^2$ | 0.11 | 0.11 | 0.19 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.

# Marital Status

| Dependent Var: | **Gets Divorced/separated** | **Divorce/separation** |
|---|---|---|
| Sample: | $m_{t-1} = 1$ | Whole |
| $Exposed_{dst}Post_{st}$ | -0.001 | -0.033*** |
| | (0.001) | (0.009) |
| Mean pre-reform | 0.009 | 0.151 |
| Obs | 207,562 | 336,129 |
| $R^2$ | 0.01 | 0.03 |
| Dependent Var: | **Gets Married** | **Married** |
| Sample: | $m_{t-1} = 0$ | Whole |
| $Exposed_{dst}Post_{st}$ | -0.001 | -0.002 |
| | (0.003) | (0.011) |
| Mean pre-reform | 0.025 | 0.756 |
| Obs | 77,489 | 336,129 |
| $R^2$ | 0.04 | 0.05 |

*Notes:* Standard errors in parentheses clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1. Data from the 1990-2004 SIPP panels and 1990-2007 March CPS.