A purse of her own: access to financial services and women's labor force participation

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Women's financial inclusion

CLOSING THE GAP

Gates Foundation commits $2.1 billion over the next five years to gender equality

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When broken down, the Gates Foundation says that $650 million of this commitment will go toward improving women's financial inclusion and reducing the barriers women face in the workplace and $1.4 billion will go toward increasing access to contraceptives and supporting various family planning organizations. The rest of the money, which includes a

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Women's Financial Inclusion Facility (WFIF)

One billion women globally lack access to financial products and services, making women's economic empowerment a key prerequisite for achieving gender equality.

The Women's Financial Inclusion Facility will promote gender equality and the economic empowerment and financial inclusion of women by providing improved access to financial products and services. In so doing, it will help close the gender gap in financial inclusion in support of the Sustainable Development Goals.

KEY INFORMATION

Eligible countries
Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Sudan, Tanzania,

Women's financial inclusion in the developed world

Many Western countries barred women from accessing financial services, such as bank accounts, loans, credit cards...

- in Germany until 1962
- in the UK until 1975
- in the US until early 1970s

The US case

Before 1970s...

- Upon marriage, banks converted women's accounts, loans and credit cards into joint accounts with the husband

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- Married women lost their former credit score
- In loan applications, women's incomes discounted by 50 %
- Loans and credit cards often required male co-signers

The US case

Starting in 1972...

- Topic picked up by women's movement: Ohio's governor task force for women and credit

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Starting in 1972...

- Topic picked up by women's movement: Ohio's governor task force for women and credit
- First state introduces anti-discrimination law specifically addressed to banks in 1972
- Until 1975, 20 states introduce similar laws
- In 1975, Equal Credit Opportunity Act (ECOA) passes nationally

This paper

Research question

- Did access to financial services affect US women's labor force participation?

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Preview of results

- Suggestive evidence that women were more likely to have independent bank accounts, loans and mortgages

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- Increase in married women's labor supply of 8.2 p.p.

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- Suggestive evidence that women were more likely to have independent bank accounts, loans and mortgages
- Increase in married women's labor supply of 8.2 p.p.
- Standard collective model predicts decrease in female labor supply
- Easy augmentation of standard model can replicate empirical results

Literature

Related empirical literature

Women's access to banking in developing countries

- Depositing wage in women's private account increases FLFP & index of financial literacy in India, cooperative model with bargaining power affected by norms (Field et al. (2021))

Savings programs in developing countries

- availability of savings possibility increases savings (Callen et al. (2018), Ashraf et al. (2006))

Cash tansfers to women

- positive relationship between female income share and child expenditure and female consumption (Lundberg et al. (1997), Duflo (2003), Bobonis (2009))

ECOA

- ECOA increases home ownership and mortgage debt (Bartscher (2021))

$\Rightarrow$ evidence from developing countries that independent banking and direct transfers to women alter their LFP and consumption share

Related theoretical literature

FLFP: Collective models based on Pareto efficiency

- Introduction of unilateral divorce laws decreases female labor supply depending on property regime (Chiappori et al. (2002),Voena (2015), Blasutto and Kozlov (2021))
- In general: increase in wife's Pareto weight decreases her labor supply

Non-cooperative models of household labor supply

- Noncooperative model with parameter governing wife's autonomy (Heath and Tan (2015))

My contribution: first paper to study women's access to financial services in a developed country, augmented collective model with increase in FLFP rather than decrease

Empirical analysis

Equal Credit Opportunity Act

- Topic of credit discrimination picked up by women's movement and NOW in 1970s

map

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- Between 1972 and 1974, 20 states adopted regulations making discrimination based on sex and/or marital status illegal

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Equal Credit Opportunity Act

- Topic of credit discrimination picked up by women's movement and NOW in 1970s
- Between 1972 and 1974, 20 states adopted regulations making discrimination based on sex and/or marital status illegal
- On national level, equal credit opportunity act (ECOA) effective in October 1975

map

Equal Credit Opportunity Act

*"It shall be unlawful for any creditor to discriminate against any applicant (**on the basis of sex or marital status**) with respect to any aspect of a credit transaction."*

- Discussed in congress in 1974, effective in 1975
- Amendment and Regulation B effective in 1977

Regulation B

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- Guideline for application form issued by FED
- Cannot require re-applying after marriage
- Must keep married woman's credit score
- Prohibits various discriminatory practices such as baby letters
- Illegal to require husbands signature...
- ... except in community property states

After the equal credit opportunity act

Effects on account ownership

- Exploit staggered introduction of credit laws in 20 states before ECOA between 1972 and 1975
- Two-way FE regression:

$$Y_{i,s,t} = \beta CL_{s,t} + \gamma' Z_{i,t} + \delta_t + c_s + \epsilon_{i,s,t}$$

where $CL_{s,t}$ is a dummy equal to 1 if state s had a credit law in year t and 0 else.

Savings account and mortgages for non-married women

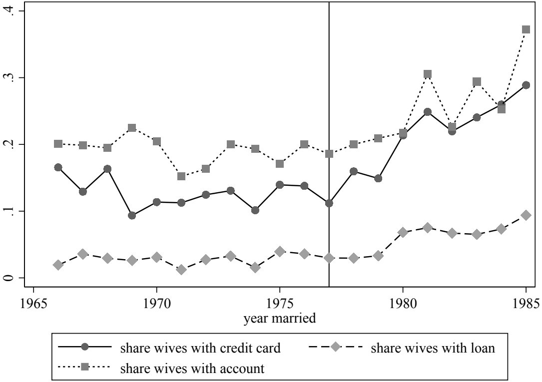
- PSID questions on savings and mortgage only on household level
- Restrict sample to households with a female head and no adult men
- Two-way FE regression on restricted sample:

Dep. var.	savings	mortgages	car
CL	0.085***	0.010	0.134***
	(0.027)	(0.013)	0.018
Obs.	1346	1323	1366
Year f.e.	√	√	√
State f.e.	√	√	√
Controls	√	√	√

Estimates adjusted for heterogeneous and dynamic treatment effects according to de Chaisemartin and d'Haulitfoeuille (2020). Controls: age, age2, marital status (single, divorced, widowed), college, nr kids. Standard errors clustered at state level.

Savings accounts and credit for married women

- SIPP 1985 asks about account ownership
- After 1977: no more transfer to joint account upon marriage
- Compare couples by year of marriage:



Interest

Effect on married women's labor force participation

ECOA did not affect married women in community property states
$\Rightarrow$ use staggered introduction and community property states as a control group

$$Y_{i,s,t} = \beta_1 CL_{s,t}^{married} + \gamma' Z_{i,t} + \delta_t + c_s + \epsilon_{i,s,t}$$

Data:
White married women between 23 and 64 in PSID who were married in 1968. Restrict time period to 1968 - 1985.

Results on female labor force participation

Outcomes:

- lfp: dummy=1 if wife worked more than 200 hours in last year

Dep. var.	lfp	hours
CL	0.082***	124.551**
	(0.029)	(58.302)
Obs.	14993	14993
Year f.e.	√	√
State f.e.	√	√
Controls	√	√

Estimates adjusted for heterogeneous treatment effects according to de Chaisemartin and d'Haultfoeuille (2020). Controls included are age, age^2 , year of marriage, hourly wage of husband, number of kids and a dummy for college. Age restricted to 23-62, years 1968-1985. Sample excludes non-whites and oversampled poor households. Standard errors are clustered at state level.

Event study

Event study men

Voluntary vs. forced introduction of credit law

- States adopting before 1975 adopted voluntarily
- Remaining states were forced to adopt in 1975

⇒ compare those two groups of states, with community property states as control group

Dep. var.	voluntary	forced
CL	0.130**	0.082*
	(0.054)	(0.047)
Obs.	6027	8246
Year f.e.	√	√
State f.e.	√	√
Controls	√	√

Estimates adjusted for heterogeneous treatment effects according to de Chaisemartin and d'Haultfoeuille (2020). Controls included are age, age^2 , year of marriage, hourly wage of husband, number of kids and a dummy for college. Age restricted to 23-62, years 1968-1985. Sample excludes non-whites and oversampled poor households. Standard errors are clustered at state level.

Model

Standard collective models

- A standard collective model cannot replicate my empirical results:
  - as wife has disutility of working, if her bargaining weight increases (ECOA), she works less
- Here: adjust standard model with two features:
  1. husband also has disutility of wife working (norm cost, see Field et al. (2021))
  2. One of the following two:
     - Automatic increase in bargaining weight wife if she works after ECOA
     - share α of wife's wage goes directly to her consumption after ECOA

Overview model

- Dynamic collective model with limited commitment
- Couples decide collectively on joint savings, consumption allocation, female labor supply, and expenditure on public good
- Divorcees decide on savings, consumption, and public good/alimony
- Incentives of marriage:
    - match quality
    - risk sharing

Utility functions

- Divorcees, c–consumption, Q – public good

$$u(c_t^j, Q_t) = \frac{c_t^{j1-\gamma}}{1-\gamma} + \frac{Q_t^{1-\epsilon}}{1-\epsilon}$$

- Couples husband, η– love shock, ψ_h – distaste for female work

$$u(c_t^h, Q_t) = \frac{c_t^{h1-\gamma}}{1-\gamma} + \frac{Q_t^{1-\epsilon}}{1-\epsilon} + \eta_t^h - \psi_h * I_t^w$$

- Couples wife, η– love shock

$$u(c_t^w, Q_t) = \frac{c_t^{w1-\gamma}}{1-\gamma} + \frac{Q_t^{1-\epsilon}}{1-\epsilon} + \eta_t^w$$

Budget constraints

- Divorcee female, τ – alimony payment

$$b_{t+1} = Rb_t + w_t - c_t - Q_t + \tau_t$$

- Divorcee male

$$b_{t+1} = Rb_t + w_t - c_t - \tau_t$$

- Couple

$$b_{t+1} = Rb_t + w_t^h + l_t^w w_t^w - c_t^w - c_t^h - Q_t$$

Value of a divorcee

$$V_t^{Dj}(\omega_t^j) = \max_{b_{t+1}^j, c_t^j, Q_t/\tau_t^h} u(c_t^j, Q_t) + \beta E_t[V_{t+1}^{Dj}(\omega_{t+1}^j)]$$

s.t. budget constraint j

Value of marriage with unilateral divorce

$$
\begin{aligned}
V_t^M(\Omega_t^M) = \max_{b_{t+1}, c_t^h, c_t^w, l_t^w, Q_t, D_t} & (1 - D_t)\{\lambda_{t+1}^w [u(c_t^w, Q_t)] \\
& + \lambda_{t+1}^h [u(c_t^h, Q_t)] + \beta E_t V_{t+1}^M(\Omega_{t+1}^M)\} \\
& + D_t\{\lambda_{t+1}^w V_t^{Dw}(\omega_t^w) + \lambda_{t+1}^h V_t^{Dh}(\omega_t^h)\} \\
\text{if } D_t = 0: & \qquad \text{s.t. BC marriage} \\
& \qquad \lambda_{t+1}^w = \lambda_t^w + \mu_t^w \\
& \qquad \lambda_{t+1}^h = \lambda_t^h + \mu_t^h \\
\text{if } D_t = 1: & \qquad \text{s.t. BC divorce}
\end{aligned}
$$

where μ_t^j are adjusted to meet the participation constraints:

$$
\begin{aligned}
u(\tilde{c}_t{}^w, \tilde{Q}_t) + \eta_t^w + \beta E_t V_{t+1}^{wM}(\Omega_{t+1}^M) &\geq V_t^w D(\omega_t^w) \\
u(\tilde{c}_t{}^h, \tilde{Q}_t) + \eta_t^h + \beta E_t V_{t+1}^{hM}(\Omega_{t+1}^M) &\geq V_t^h D(\omega_t^h)
\end{aligned}
$$

Simplified notation

$$\max_{b_{t+\mathbf{1}}, c_t^h, c_t^w, l_t^w, Q_t, D_t} \underbrace{(\lambda_t^w + \mu_t^w)}_{=\lambda_{t+\mathbf{1}}^w}[U^{Mw}(c_t^w, Q_t, l_t^w)] + \underbrace{(\lambda_t^h + \mu_t^h)}_{\lambda_{t+\mathbf{1}}^h}[U^{Mh}(c_t^h, Q_t, l_t^w)]$$

s.t. BC marriage

w's value of marriage $V_t^{Mw} \geq$ w's value of divorce V_t^{Dw}

h's value of marriage $V_t^{Mh} \geq$ h's value of divorce V_t^{Dh}

How the model works: an example

Suppose in period t the wife has a bad love shock s.t. $V^{Mw}(\lambda_t^w, \lambda_t^h) < V^{Dw}$ but the husband prefers to stay married ($V^{Mh}(\lambda_t^w, \lambda_t^h) > V^{Dh}$):

1. the couple finds a new value for the wife's weight s.t. $V^{Mw}(\lambda_t^w + \mu_t^w, \lambda_t^h) = V^{Dw}$
2. if for new weight $V^{Mh}(\lambda_t^w + \mu_t^w, \lambda_t^h) \geq V^{Dh}$, couple stays married and $\lambda_{t+1}^w = \lambda_t^w + \mu_t^w$ and $\lambda_{t+1}^h = \lambda_t^h$
3. if $V^{Mh}(\lambda_t^w + \mu_t^w, \lambda_t^h) < V^{Dh}$, the couple divorces

Reminder: Changes with the ECOA

- women can have a bank account without husbands signature
- many credit constraints that women faced were lifted (ie 50% discounting of income, husband's signature, baby letters,...)
- divorced women receive credit score → facilitates access to credit significantly

Modeling access to banking

Changes to problem of divorcees:

- introduce interest paid to divorced women
- allow borrowing also for divorced women

$\rightarrow$ these raise bargaining weight wife

How to model access to banking within marriage?
Ideas:

1. share α of wife's wage goes directly into her consumption
   - Caveat: this cannot influence intratemporal problem
2. if wife works, her bargaining weight increases by ω

Idea 1: New problem of marriage

$$\max_{c_t^w, c_t^h, Q_t, l_t^w, b_{t+1}, D_t} (1 - D_t)\{\lambda_{t+1}^w[u(c_t^w, Q_t, \alpha, l_t^w)] + \lambda_{t+1}^h[u(c_t^h, Q_t)] + \beta E_t V_{t+1}^M(\Omega_{t+1}^M)\}$$

$$\text{s.t. BC:} c_t^w + c_t^h + b_{t+1} = (1 + r) * b_t + w_t^h + \alpha * w_t^w * l_t^w$$

$$V_t^{Mw}(\alpha) \geq V_t^{Dw}$$

$$V_t^{Mh}(\alpha) \geq V_t^{Dh}$$

intratemporal problem

Idea 2: increase in bargaining weight if wife works

$$\max_{c_t^w, c_t^h, Q_t, l_t^w, b_{t+1}, D_t} (1 - D_t)\{(\lambda_{t+1}^w + \omega l_t^w)[u(c_t^w, Q_t, l_t^w)] + \lambda_{t+1}^h [u(c_t^h, Q_t)] + \beta E_t V_{t+1}^M(\Omega_{t+1}^M)\}$$

$$\text{s.t. BC in marriage}$$
$$V_t^{Mw}(\omega) \geq V_t^{Dw}$$
$$V_t^{Mh}(\omega) \geq V_t^{Dw}$$

Estimation

Pre-set parameters

Parameter	Symbol	Value	Source
Initial age		23	
Number of time periods	T	13	
Years per period		3	
Interest rate	R	3%	
Rel. risk aversion private good	γ	1.5	Attanasio et al. (2008)
Discount factor	β	0.98	Attanasio et al. (2008)

External estimation of the parameters of the income process

Use PSID to estimate income process for men:

$$ln(w_{i,t,s,y}) = \alpha_0^m + \alpha_1^m t + \alpha_2^m t^2 + \delta_s + \mu_y + u_{i,t,s,y}^m$$

where i is individual, t is age, s is state and y is year. Further, $u_{i,t,s,y}^m = z_t^m + e_{i,t,s,y}^m$ with $e_{i,t,s,y}^m$ = measurement error.
For women:

- Two step procedure to account for endogenous participation decision

Parameters to estimate

Internal estimation of the following parameters $\vartheta = (\epsilon, \psi_h, \sigma_\eta)$ by indirect inference:

Relative risk aversion public good	ϵ
Norm disutility female work	ψ_h
Standard deviation to the love shocks	σ_η

- Sample: 50-50 division states, PSID data
- Simulate behavior of 30'000 agents in model for parameters ϑ
- Compare empirical and simulated moments to solve

$$\hat{\vartheta} = argmin_{\vartheta}(\hat{\boldsymbol{m}}_{\text{data}} - \boldsymbol{m}_{\text{sim}}(\boldsymbol{\vartheta}))' \boldsymbol{W}(\hat{\boldsymbol{m}}_{\text{data}} - \boldsymbol{m}_{\text{sim}}(\boldsymbol{\vartheta}))$$

Estimated moments

- Response of female participation when ECOA is introduced
- Average female participation rate before ECOA
- Average divorce rate before ECOA

Appendix

Intratemporal problem of marriage I

First, solve for consumption share husband c^h and wife c^w with $C = c^w + c^h$:

$$\max_{c^w, c^h} \lambda^w \left(\frac{(c^w)^{1-\gamma}}{1-\gamma} + \frac{Q^{1-\epsilon}}{1-\epsilon} \right) + \lambda_h \left(\frac{(c^h)^{1-\gamma}}{1-\gamma} + \frac{Q^{1-\epsilon}}{1-\epsilon} \right)$$

Taking FOC's yields: use $A = \frac{\lambda_h}{\lambda_w}$ to get $c^w = \frac{C}{1+A^{1/\gamma}}$, $c^h = \frac{A^{1/\gamma} * C}{1+A^{1/\gamma}}$

Intratemporal problem of marriage II

Second, substitute these solutions into the problem and solve for C and Q using C+Q = W, with $W = b - b_{t+1} + w^h + w^w * (1-\alpha)$:

$$\max_{C,Q} \lambda^w \left(\frac{\left(\frac{C}{1+A^{1/\gamma}}\right)^{1-\gamma}}{1-\gamma} + \frac{Q^{1-\epsilon}}{1-\epsilon} \right) + \lambda_h \left(\frac{\left(\frac{A^{1/\gamma} * C}{1+A^{1/\gamma}}\right)^{1-\gamma}}{1-\gamma} + \frac{Q^{1-\epsilon}}{1-\epsilon} \right)$$

Taking FOC yields:

$$C^{-\gamma} * (1 + A^{1/\gamma})^{\gamma-1} * \left(\lambda_w + \lambda_h * A^{\left(\frac{1-\gamma}{\gamma}\right)} \right) = (W - C)^{-\epsilon} * (\lambda_w + \lambda_h)$$

Intertemporal problem of marriage

Substitute solution from intratemporal problem into utility:

$$\max_{b_{t+1}, l_t^w, D_t} \lambda^w \left(\frac{(c_t^{w*} + \alpha w^w l_t^w)^{1-\gamma}}{1-\gamma} + \frac{(Q_t^*)^{1-\epsilon}}{1-\epsilon} \right) + \lambda^h \left(\frac{(c_t^{h*})^{1-\gamma}}{1-\gamma} + \frac{(Q_t^*)^{1-\epsilon}}{1-\epsilon} \right)$$

$$\text{s.t. } c_t^{w*} + c_t^{h*} + b_{t+1} = w_t^h + (1-\alpha) * w_t^w * l_t^w + (1+r) b_t$$

$$V_t^{Mw} \geq V_t^{Dw}$$

$$V_t^{Mh} \geq V_t^{Dh}$$

back

Models out there fitting my scenario

- Current: Collective models with disutility of husband when wife works (not new)
- Non-cooperative models where husband confiscates share of wife's income (not new)
- Semi-cooperative model (semi new)

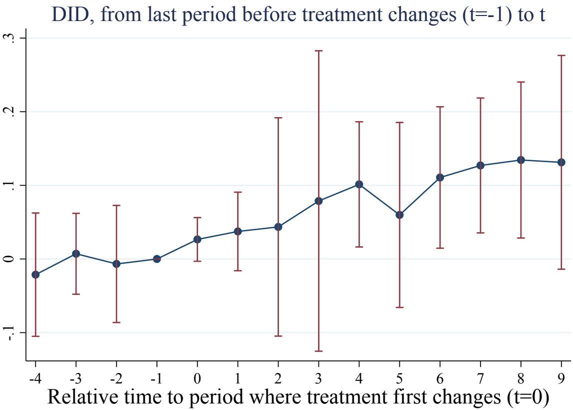
Income process estimation

- Use PSID to estimate income process
- Fit following linear model for men:

$$ln(w^m_{i,t,s,y}) = \iota^m_0 + \iota^m_1 * t + \iota^m_2 * t^2 + \delta_s + \nu_y + u^m_{i,t,y}$$

  where $u^m_{i,t,y} = z^m_t + e^m_{i,t,y}$ with $z^m_t = z^m_{t-1} + \zeta^m_t$ where $\zeta^m_t \overset{\text{i.i.d.}}{\sim} \mathcal{N}(0, \sigma^{2m}_\zeta)$
- estimate variances using residuals
- For women, need to also consider endogeneity of working decision, usually done by Heckman selection correction

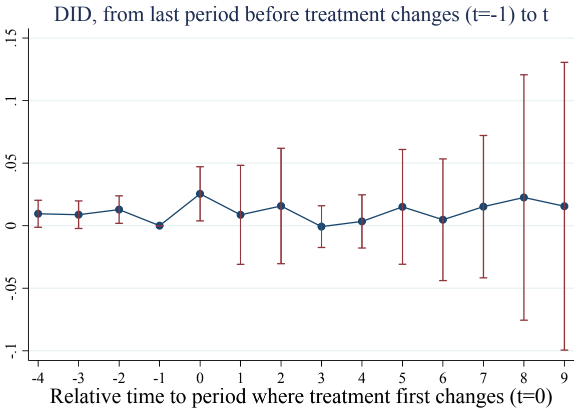
LFP event study



Estimates adjusted for heterogeneous treatment effects according to de Chaisemartin and d'Haltfoeuille (2020)

back

LFP event study men

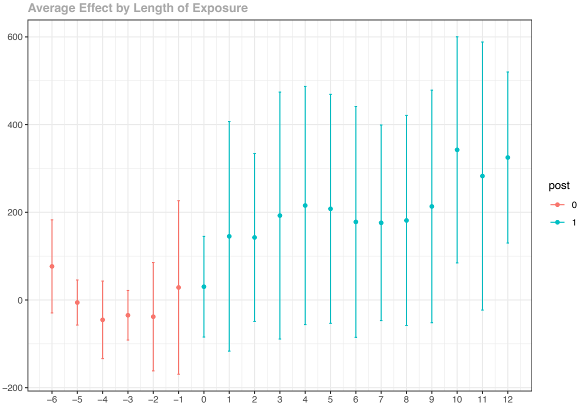


Estimates adjusted for heterogeneous treatment effects according to de Chaisemartin and d'Haltfoeuille (2020)

back

Results on hours

Outcome: Hours worked last year

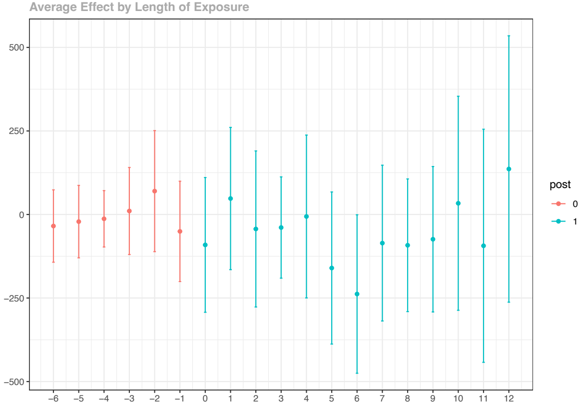


Calloway and Sant'Anna (2020) estimates, includes individual and year fixed effects, standard errors clustered at state level.

back

Results on hours

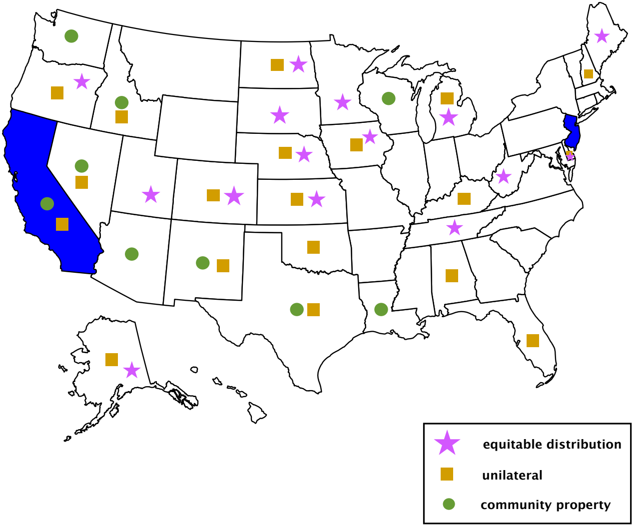
Outcome: Hours worked last year men



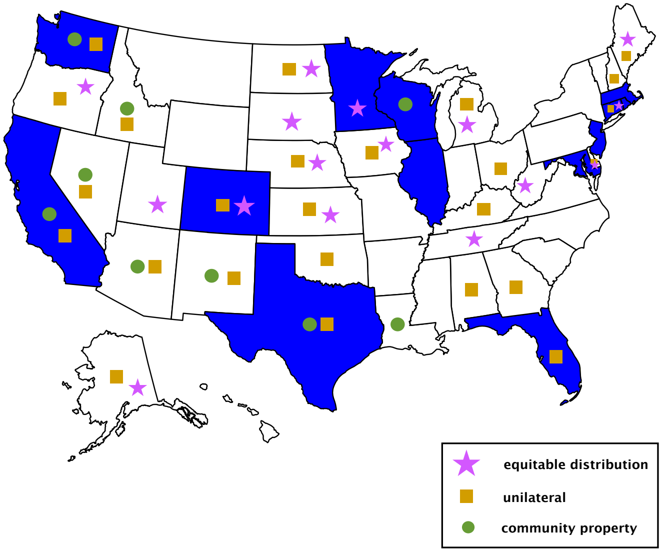
Calloway and Sant'Anna (2020) estimates, includes individual and year fixed effects, standard errors clustered at state level.

back

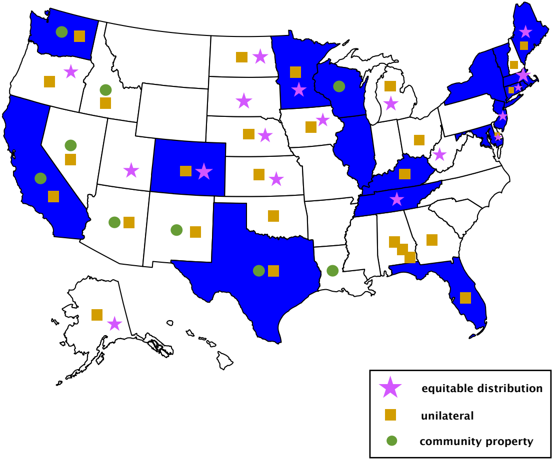
Adoption of anti-discrimination legislation in 1972



Adoption of anti-discrimination legislation in 1973



Adoption of anti-discrimination legislation in 1974



Back

Interest earned on different types of accounts

SIPP 1985, log interest paid, by year of marriage

Back

Banking Regulation in the U.S

- 1927: McFadden Act permits states to restrict branching of national banks
- 1956: Bank Holding Company Act allows states to restrict entry by out-of-state banks and holding companies (since all state prohibit it, this effectively prevents interstate banking)
- In 1970 only 12 states allowed unrestricted state wide branching, which starting in 1975 is gradually introduced in all other states
- In 1982, three states allow interstate banking and by 1994 interstate banking is allowed in all states

$\Rightarrow$ larger number of small to very small banks in period of interest