Rethinking the Welfare State

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Motivation

1. Sizeable redistribution via 'welfare' programs and tax-credit provisions in the U.S. (nearly 2.5% of GDP). Transfers critically depend on marital status/gender differences and the presence of children.

2. Multiple means-tested programs that transfer to poor and middle-income households. Can simple alternatives do better?

3. Need to think about wage (earnings) inequality

   → Marital status/gender differences usually not taken into account.

4. Potential interplay between two-earner households, non-linear taxation and the transfer system. Largely unexplored.

This Project

- Focus with high resolution on the U.S. transfer system for working-age households. Exclude health-related transfers.

  Welfare State – amalgam of traditional welfare programs, EITC, childcare subsidies and child-related tax credits.

- We develop an equilibrium framework with uninsurable shocks, labor supply decisions in two-earner households, costly children, and a detailed representation of taxes/transfers.

Questions:

- Do households value current social insurance/redistributive programs in the U.S.?
- What are the macroeconomic and welfare effects of policy reforms?

What we do

- Document facts on inequality over the life-cycle for *different types of households* – married, single, skilled, unskilled.
- Develop a life-cycle economy that has the potential to account for these facts under a detailed representation of welfare state.
- Use this framework to quantitatively evaluate/understand:

  (i) how households value current transfer system;

  (ii) a system that replaces current transfers with a Universal Basic Income (UBI);

  (iii) a system that replaces current taxes and transfers with a *linear income tax* – a Negative Income Tax (NIT)

Preview of Findings

- Overall, it is hard to improve over the existing welfare state.
- We find that a revenue-neutral elimination of transfers leads to large welfare losses BUT is supported by a majority of newborn households.
- A Universal Basic Income is <u>not</u> a good idea.
- Negative Income Tax arrangements can improve upon the status quo and be supported by a <u>large majority.</u>
- Why a NIT? KEY: larger redistribution is possible via lower distortions that permit larger tax collections.

Model - big picture

- Ex-ante heterogenous married and single households hit by uninsurable productivity shocks;

  $\rightarrow$ Ex-ante differences in endowments (education).

  $\rightarrow$ Permanent and persistent shocks to labor endowments.

- Labor supply decisions at intensive and extensive margins;
- Skill depreciation for females associated to non-participation;
- Costly children in married and single households;
- Equilibrium model with imperfect substitutability of skills in production;
- Policy $\rightarrow$ tax credits, transfers and non-linear taxes (progressive) conditional on income and number of children

Model – Demographics and Heterogeneity

- Life-cycle economy, $j = 1, ..., J_R, ...J$.
- Males (m) and females (f), who differ in terms of intrinsic types – skilled (s) and unskilled (u).
  - Male types (z) map into exogenous productivity profiles $\varpi(z, j)$, $z = s, u$.
  - Female types (x) map into initial productivity levels, $x = s, u$.
- Agents can be single or married. Marital status is exogenous, and does not change over the life-cycle.

Model – Demographics and Heterogeneity

- Married households and single females differ in terms of the number of children attached to them.
  - Three possibilities: *without*, *early*, *late* $(b = 0, 1, 2)$.
- If $b \neq 0$, children show up at ages $\bar{j}(x, z, b)$ for married households and $\bar{j}(x, b)$ for single females.
- If two household members work and children are present, the household has to pay for childcare costs, that vary with the age of children.
- If two adult household members work, the household incurs in additional utility costs. This helps capturing residual female participation differences across households.

Model – Female Skills

- Female types map into initial productivity levels, $h_1 = \eta(x)$.
- After age 1, labor market productivity of females evolves endogenously:

$$h' = \exp[\ln h + \underbrace{\alpha_x^e}_{\text{growth}} \chi(l) - \underbrace{\delta_x}_{\text{depreciation}} (1 - \chi(l))], \quad x = s, u$$

e : labor market experience.

Model – Earnings

- For an age-j single male of type $z = s, u$, earnings are given by

$$\underbrace{w_z}_{\text{wage by skill}} \underbrace{\varpi(z,j)\exp(\upsilon^S_{m,z} + \eta^S_{m,z,j})}_{\text{labor efficiency}} \underbrace{l_m}_{\text{hours}}$$

- Persistent shock:

$$\eta^S_{m,z,j+1} = \eta^S_{m,z,j} + \varepsilon^S_{m,z,j+1}, \quad z = s, u$$

with $\eta^S_{m,x,1} = 0$, $\varepsilon^S_{m,z,j+1} \sim N(0, \sigma^2_{\varepsilon^S_{m,z}})$

- Permanent shock:

$$\upsilon^S_{m,z} \sim N(0, \sigma^2_{\upsilon^S_{m,z}}), \quad z = s, u$$

Model – Earnings

- For a single female of age-j of type $x = s, u$, with human capital h, earnings are given by

$$\underbrace{w_x}_{\text{wage by skill}} \quad \underbrace{h \; \exp(\nu^S_{f,x} + \eta^S_{f,x,j})}_{\text{labor efficiency}} \underbrace{l_f}_{\text{hours}}$$

- Persistent shock:

$$\eta^S_{f,x,j+1} = \eta^S_{f,x,j} + \varepsilon^S_{f,x,j+1}, \quad x = s, u$$

$\eta^S_{f,x,1} = 0$, $\varepsilon^S_{f,x,j+1} \sim N(0, \sigma^2_{\varepsilon^S_{f,x}})$

- Permanent shock:

$$\upsilon^S_{f,x} \sim N(0, \sigma^2_{\upsilon^S_{f,x}}), \quad x = s, u$$

Model – Earnings

- Married couples earnings:

$$w_x \underbrace{h \exp(\nu^M_{f,x} + \eta^M_{f,x,j})}_{\text{labor efficiency}} l_f + w_z \underbrace{\varpi(z,j) \exp(\nu^M_{m,z} + \eta^M_{m,z,j})}_{\text{labor efficiency}} l_m$$

- Persistent shocks:

$$\eta^M_{m,z,j+1} = \eta^M_{m,z,j} + \varepsilon^M_{m,z,j+1} \quad , \quad \eta^M_{f,x,j+1} = \eta^M_{f,x,j} + \varepsilon^M_{f,x,j+1}$$

with $\eta^M_{m,z,1} = \eta^M_{f,x,1} = 0$ and

$$(\varepsilon^M_{m,z,j+1}, \varepsilon^M_{f,x,j+1}) \sim N \left(\begin{array}{ccc} 0 & & \sigma^2_{\varepsilon^M_{m,z}} \quad \sigma_{\varepsilon_f \varepsilon_m} \\ 0 & , & \sigma_{\varepsilon_f \varepsilon_m} \quad \sigma^2_{\varepsilon^M_{f,x}} \end{array} \right)$$

- Permanent shocks:

$$(\upsilon^M_{m,z}, \upsilon^M_{f,x}) \sim N \left(\begin{array}{ccc} 0 & & \sigma^2_{\upsilon^M_{m,z}} \quad \sigma_{\upsilon_f \upsilon_m} \\ 0 & , & \sigma_{\upsilon_f \upsilon_m} \quad \sigma^2_{\upsilon^M_{f,x}} \end{array} \right)$$

Model – Idiosyncratic Productivity Shocks

Comments:

- Many parameters.
- Variances depend on gender, skill and marital status.
- We infer variances and covariances from data – inequality in wages and correlations in wages between spouses at different stages in life cycle.
- Specification of shocks is a mixture of RIP and HIP.

Model –Transfers and Taxes

- Let $I \equiv$ household income. Let $k \equiv$ number of kids. Let $D \equiv$ childcare expenses

  Total transfer functions: $TR^M(I, k, D)$ and $TR_i^S(I, k, D)$, $i = m, f$.

  Income tax *functions*: $T^M(I, k)$ and $T^S(I, k)$

- Parametric tax functions: $(1 - T/I) = \lambda I^{-\tau}$.

  λ : controls level of taxation;

  τ : controls curvature.

- There is a social security system financed by a flat payroll tax, τ_p, plus additional flat capital income tax τ_k.

  Social Security benefits conditioned on skills (skilled, unskilled) and marital status.

Decisions – Big Picture

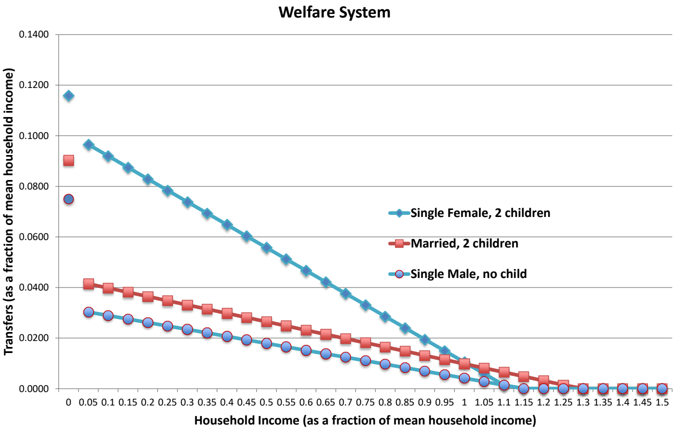
- Households have access to one-period, risk-free asset. They decide how much to consume, save and the work of their members.
- Given their state, married households decide whether the female member should work or not.
  - Costs of work: child care expenses, additional taxes.
  - Benefits: higher household income, future human capital.
- Taxation plus structure and generosity of transfers affect the cost and benefits of work.

Benchmark Economy: Transfers

- Welfare Programs: we use the Survey of Income and Program Participation (SIPP), 1995-2013.
  - Include AFDC/TANF, SSI, Food Stamps/SNAP, WIC and Housing Assistance.
- Child-related transfers: Child Tax Credit (CTC), Childcare Credit (CDCTC) and CCDF (childcare subsidies).
- Earned Income Tax Credit (EITC)

→ Model last two as they are in the tax code.

Benchmark Economy: Welfare Programs



Benchmark Economy

Skilled individuals (college educated or higher). **Unskilled** (less than college).

Given (i) structure of taxes and transfers and (ii) demographics (who is married and with whom, childbearing, etc), select parameter values so as to

- Match inequality at different stages of life cycle;
- Match (initial) gender-wage gap variation over life cycle;
- Match aggregate participation rates and by age of young child;
- Match skill premium;
- Match capital-output ratio.

Model and Data

Aggregates	Data	Model
Capital Output Ratio	2.9	2.9
Total Transfers (% of GDP)	2.3	2.3
LFP of Married Females (%), 25-54		
Unskilled	68.2	68.7
Skilled	77.4	77.7
Inequality		
Household Earnings 90-10 ratio	7.8	7.2
Household Earnings 90-50 ratio	2.6	2.5
Skill Premium	1.8	1.8
Variance log-wages (Married Males, age 54, S)	0.45	0.45
Variance log-wages (Married Males, age 54, U)	0.34	0.34
Variance log-wages (Married Females, age 54, S)	0.35	0.35
Variance log-wages (Married Females, age 54, U)	0.26	0.26
Variance log-hours (Married Females, age 40)	0.13	0.13
Correlation Between Wages of Spouses (age 25)	0.31	0.31
Correlation Between Wages of Spouses (age 40)	0.34	0.33
Variance log-consumption (Age 50-54 vs 25-29)	0.12	0.12

Rethinking the Welfare State

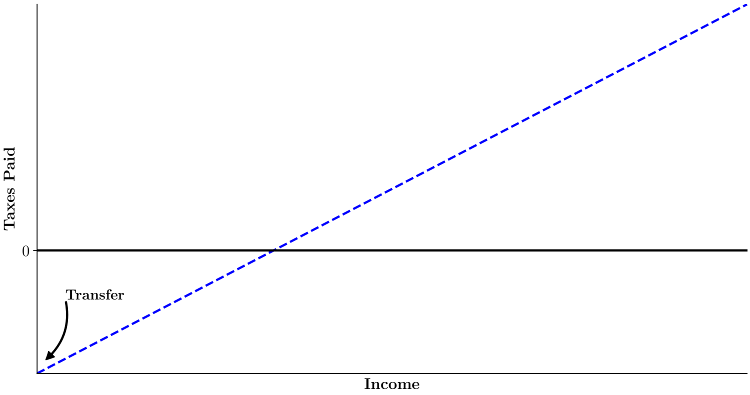
- What are the effects of abolishing the welfare state? Do households value the current scheme?

  $\rightarrow$ Eliminate all transfers. Taxes reduced for all.

- Replace all transfers with a Universal Basic Income (UBI) transfer.
  - Each household receives a transfer per member (including children) in all dates and states.
  - Existing taxes unchanged. Additional resources shifting up level of tax function.

- Replace income taxes and all transfers with a Negative Income Tax (NIT)
  - Each household receives a transfer per member (including children) in all dates and states.
  - All households face same proportional income tax.

Negative Income Tax



Eliminating Welfare State

Eliminating Transfers (% changes relative to benchmark)

	All	Welfare Programs	EITC Program	Child-Related Programs
Output	1.7	1.1	0.4	0.1
Aggregate Hours	3.0	1.9	0.9	0.1
Married Females LFP				
Unskilled	6.3	4.0	4.0	-1.9
Skilled	2.0	1.4	1.1	-0.6
Total	4.5	2.9	2.8	-1.4
Welfare (CV, Newborns)	-3.2	-1.3	-0.3	-0.8
Winning Households	60.7	66.5	81.0	47.5

→ Large welfare losses – but substantial majority support for eliminating current scheme. Elimination of traditional welfare programs leads to largest losses.

Universal Basic Income

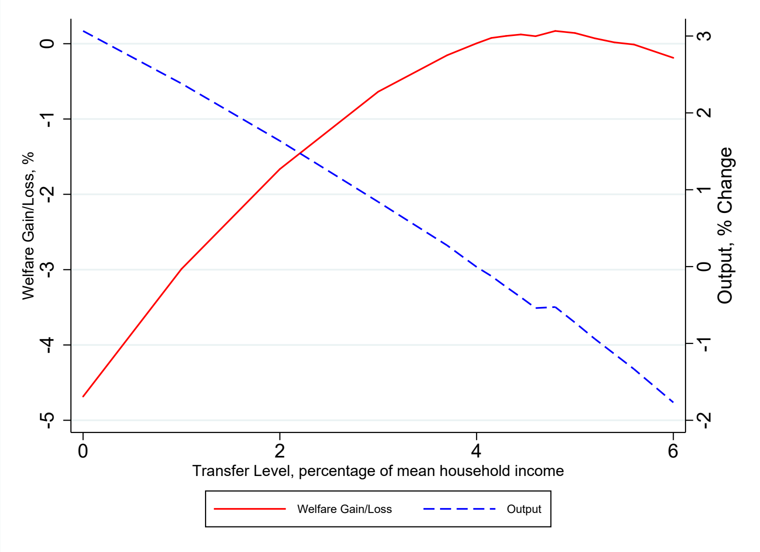
UBI (% changes relative to benchmark)

	No Transfers	UBI (Maximum Welfare)
Output	1.7	-0.9
Aggregate Hours	3.0	-0.9
Married Females LFP		
Unskilled	6.3	-4.4
Skilled	2.0	-1.9
Total	4.5	-3.4
Transfer (% Household Income)	-	3.2
Transfers (% Output)	-	5.9
Welfare (CV, Newborns)	-3.0	-1.3
Winning Households	60.7	53.2

→ UBI does NOT lead to welfare gains. But majority support!

UBI transfer: about $ 3,200 per person in current dollars.

Negative Income Tax



NIT (% changes relative to benchmark)

	No Transfers	UBI	NIT
Output	1.7	-0.9	-0.6
Aggregate Hours	3.0	-0.9	-1.2
Married Females LFP			
Unskilled	6.3	-4.4	-6.0
Skilled	2.0	-1.9	-2.3
Total	4.5	-3.4	-4.4
Transfer (% Household Income)	-	3.2	4.8
Transfers (% Output)	-	5.9	8.8
Welfare (CV, Newborns)	-3.0	-1.3	0.2
Winning Households	60.7	53.2	68.2

→ UBI dominated by NIT in terms of welfare and support.

→ UPSHOT: more redistribution feasible with lower distortions.

NIT transfer: about $ 4,800 per person in current dollars.

NIT (% changes relative to benchmark)

	UBI	NIT	NIT (2)
Output	-0.9	-0.6	-0.4
Aggregate Hours	-0.9	-1.2	-1.0
Married Females LFP			
Unskilled	-4.4	-6.0	-4.2
Skilled	-1.9	-2.3	-1.5
Total	-3.4	-4.4	-3.1
Transfer (% Household Income)	3.2	4.8	7.0, 4.1
Transfers (% Output)	5.9	8.8	8.7
Welfare (CV, Newborns)	-1.3	0.2	0.7
Winning Households	53.2	68.2	51.4
Welfare (with transitions)	-0.5	0.4	1.0

Note: NIT (2): transfers depend on marital status.

Findings in Perspective: NIT (% changes relative to benchmark)

	Baseline Findings	Lower Inequality	Cohort Effects
Output	-0.6	0.6	0.6
Aggregate Hours	-1.2	0.8	0.4
Married Females LFP			
Unskilled	-6.0	-0.3	-1.1
Skilled	-2.3	-0.2	1.4
Total	-4.4	0.3	0.0
Transfer (% Household Income)	4.8	3.0	4.7
Transfers (% Output)	8.8	5.9	8.6
Tax Rate (%)	19.8	14.8	19.6
Welfare			
All Newborns (%)	0.2	0.7	0.8
Winning Households	68.2	81.0	67.5

NOTE: Lower Inequality economy $\rightarrow$ parameterized to 1980 data.

Conclusions

- We develop life-cycle model with novel ingredients, suitable for policy analysis. It goes a long way towards reproducing patterns of life-cycle inequality (all and new).
- Overall, it is hard to improve over the existing welfare system.
- A Universal Basic Income is not a good idea.
- NIT arrangements can improve upon the status quo and be supported by a <u>large majority.</u>

  NIT is a better option under certain scenarios (cohort view of life-cycle data, lower inequality, etc).
- Why a NIT? KEY: larger redistribution is possible via lower distortions (larger tax collections).

EXTRA SLIDES – new

Problem – Married Households w/kids

$b = \{1, 2\}$, $j \in \{\bar{j}(x, b), ..., N+2\}$, $\mathcal{S}^M \equiv (x, z, \theta, \boldsymbol{v}, q, b)$

$$V^M(a, h, e, \mathcal{S}^M, \boldsymbol{\eta}, j) = \max_{a',\, l_f,\, l_m} \{U^M(c, l_f, l_m, q, x, z, b, j) + \beta \mathbf{E}_{\boldsymbol{\eta}'|\boldsymbol{\eta}} V^M(a', h', e', \mathcal{S}^M, \boldsymbol{\eta}', j+1)\},$$

subject to

$$c + a' = \left\{ \begin{array}{l} a(1 + r(1 - \tau_k)) + \mathcal{E}^M(x, z, h, \boldsymbol{\eta}, \boldsymbol{\nu}, l_m, l_f, j)(1 - \tau_p) \\ -T^M(I, \mathcal{K}) + TR^M(I, \mathcal{K}, D) - w^u D \chi(I), \end{array} \right\}$$

where $I = \mathcal{E}^M(x, z, h, \boldsymbol{\eta}, \boldsymbol{\nu}, l_m, l_f, j) + ra$.

$$\mathcal{K} = \frac{k(x,z,b)}{2} \left[\underbrace{\chi(\bar{j}(x,z,b) \le j \le \bar{j}(x,z,b) + N)}_{\text{old children}} + \underbrace{\chi(\bar{j}(x,z,b) + 2 \le j \le \bar{j}(x,z,b) + 2 + N)}_{\text{young children}} \right],$$

and

$$\begin{aligned} D \quad = \quad & \frac{k(x,z,b)}{2}\ d(x,z,b,j - \bar{j}(x,z,b) + 1)\chi(\bar{j}(x,,z,b) \le j \le \bar{j}(x,z,b) + N) + \\ & \frac{k(x,z,b)}{2}\ d(x,z,b,j - \bar{j}(x,z,b) + 3)\chi(\bar{j}(x,z,b) + 2 \le j \le \bar{j}(x,z,b) + 2 + N) \end{aligned}$$

Data

- Earnings and Hours: CPS, 1980-2018
  - Household heads and their spouses between ages 25 to 60;
  - Two groups: skilled (college educated or higher) and unskilled (less than college).
- Drop all observations with

  (i) hourly wage lower than federal minimum wage;

  (ii) hours lower than 520 hours per year.
- To account for top-coded observations, we fit a Pareto distribution as in Heathcote, Perri and Violante (2010).
- Consumption Expenditure Survey (CEX) $\rightarrow$ non-durable consumption expenditure.
- Benchmark: We estimate age effects controlling for time (year) effects.

$$stat_{a,t} = \beta_a' \mathbf{D}_a + \beta_t' \mathbf{D}_t + \varepsilon_{a,t}$$

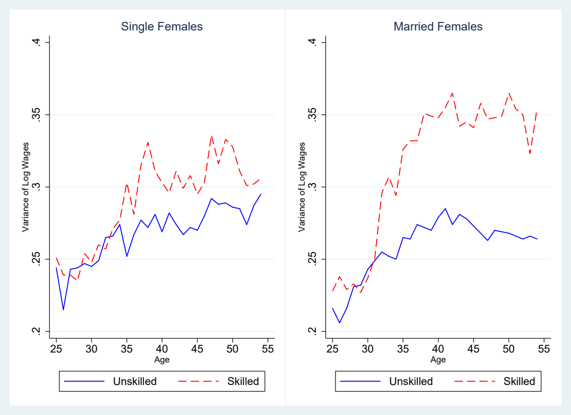
Data

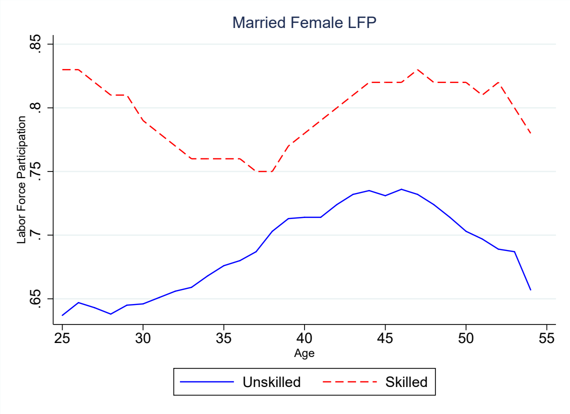
1. Hourly wages grow faster for skilled (college) than for unskilled (non college) workers.
2. Variance of log earnings (wages) for males increases non-trivially with age. BUT for females, married or not, we *do not observe* such increase.
3. Wage-gender gap increases with age, more rapidly for the skilled group.
4. LFP rate of married females first declines and then rises, and then declines again. Stronger changes for the skilled group.
5. The variance of log consumption increases over the life-cycle.

   $\rightarrow$ But *much less than* the increase in the variance of household earnings.

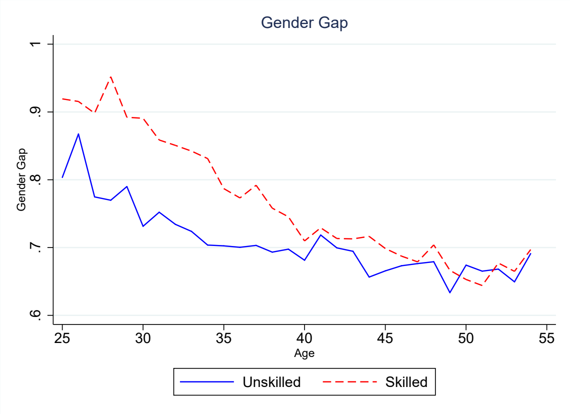
Variance of Log-Wages (males)

Variance of Log-Wages (females)





Married Female LFP
Labor Force Participation
.85
.8
.75
.7
.65
25
30
35
40
45
50
55
Age
Unskilled
Skilled


Gender Gap
Gender Gap
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Age
Unskilled
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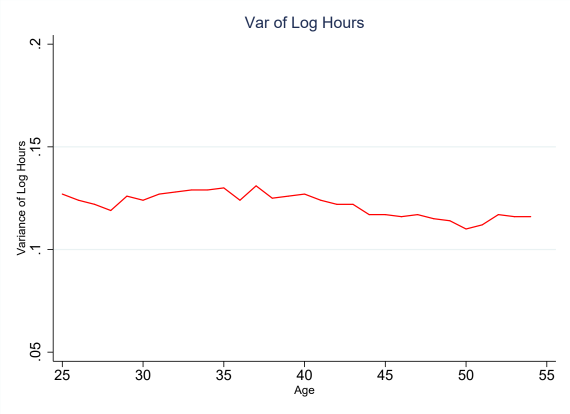
Var of Log Hours
Variance of Log Hours
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Age


Correlation of Earnings
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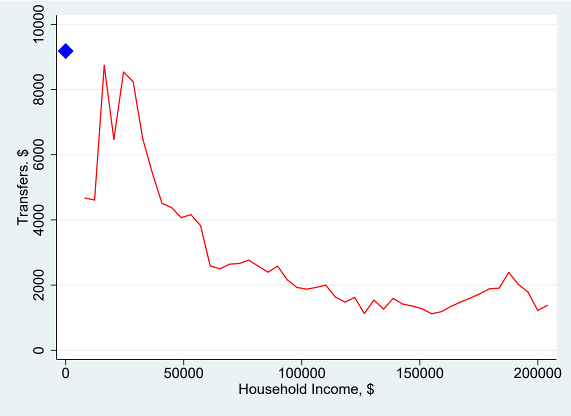

Transfers. $
0
2000
4000
6000
8000
10000
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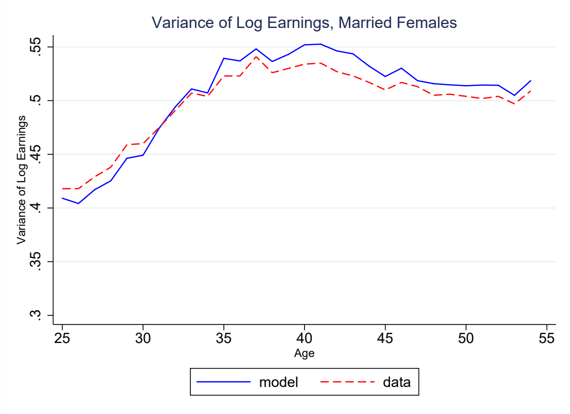
50000
100000
150000
200000
Household Income, $


Variance of Log Earnings, Married Females
Variance of Log Earnings
.3
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Married Males
Single Males
Variance of Log Wages
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Unskilled, Model
Skilled, Model


Married Females
Single Females
Variance of Log Wages
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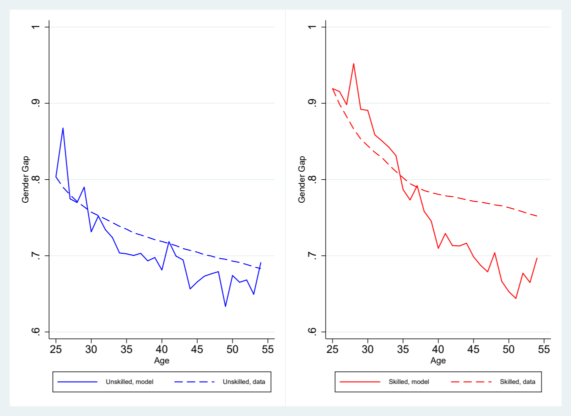
Skilled, Model


Gender Gap
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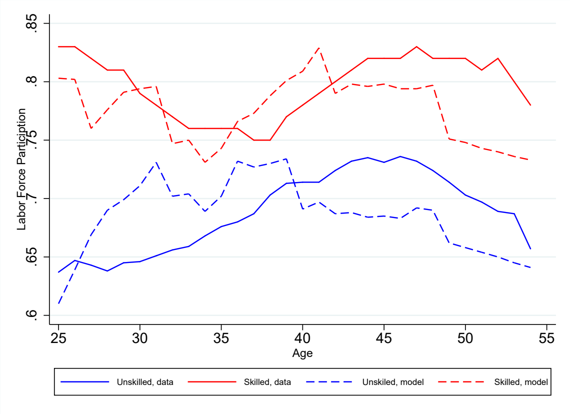

Labor Force Participation
.6
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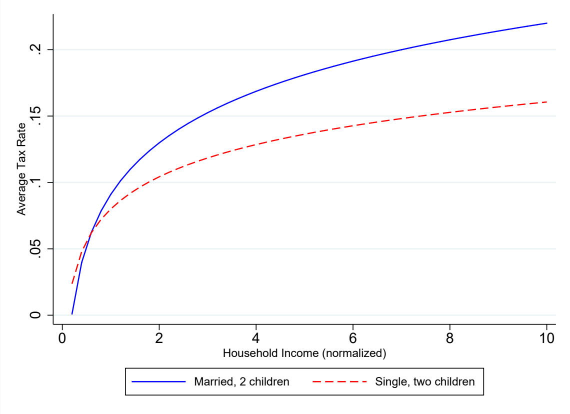
Unskiled, model
Skilled, model

Tax Functions



EXTRA SLIDES

More on Welfare: NIT

CV (%), Married Couples

	Unskilled, F	Skilled, F
Unskilled, M	2.8	0.4
Skilled, M	0.3	0.6

CV (%), Singles

	Female
Unskilled	-2.0
Skilled	-0.7

Model – Preferences

- Single males and single females:

$$U_m^S(c,l) = \log(c) - B_m\ l^{1+\frac{1}{\gamma}},\ \ U_f^S(c,l) = \log(c) - B_f\ l^{1+\frac{1}{\gamma}}.$$

- Joint market work for married couples also implies a utility cost, q. Value of q for married couples drawn at start of life cycle.

  $\rightarrow$ Captures *residual heterogeneity* in labor force participation.

- Married couples also differ in the disutility of work of females, θ.

Model – Preferences

- Married couples (without children)

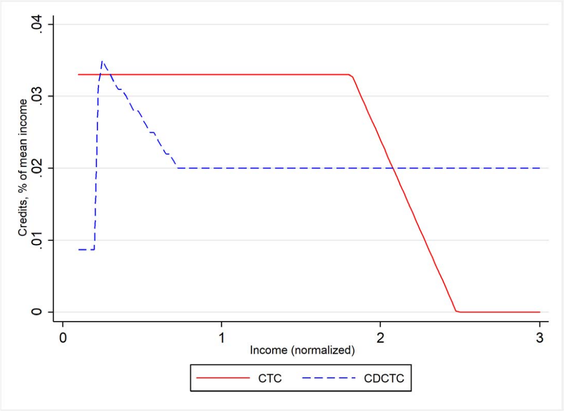
$$U^M(c, l_f, l_m, \theta, q) = 2\log(c) - B_m \; l_m^{1+\frac{1}{\gamma}} - B_f \; \theta \; l_f^{1+\frac{1}{\gamma}} - \chi\{l_f\} \; q$$

- Married couples (with children at home)

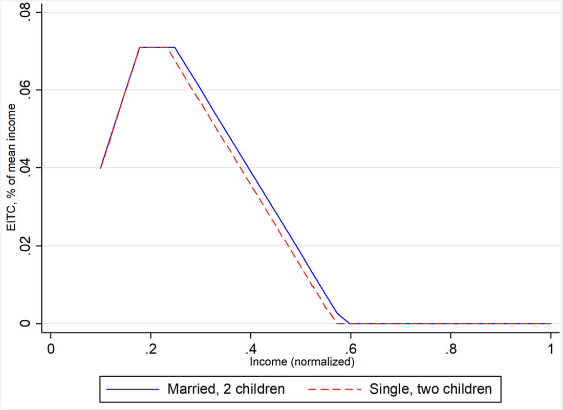
$$U^M(c, l_f, l_m, \theta, q, t) = 2\log(c) - B_m \; l_m^{1+\frac{1}{\gamma}} - B_f \; \theta \; l_f^{1+\frac{1}{\gamma}} - \chi\{l_f\} \; q \; (1 + \vartheta(t)).$$

t: age of youngest children at home.

Benchmark Economy: Child-Related Transfers



Benchmark Economy: EITC



The Structure of Shocks

Permanent Shocks.

Variance single skilled males: 0.281
Variance single unskilled males: 0.244

Variance single skilled females: 0.226
Variance single unskilled females: 0.226

Variance married skilled males: 0.230
Variance married unskilled males: 0.230

Variance married skilled females: 0.220
Variance married unskilled females: 0.228

Covariance(male, female): 0.047

The Structure of Shocks

Persistent Shocks.

Variance single unskilled males: 0.0042
Variance single skilled males: 0.0066

Variance single unskilled females: 0.00195
Variance single skilled females: 0.0015

Variance married unskilled males: 0.0036
Variance married skilled males: 0.0061

Variance married unskilled females: 0.0008
Variance married skilled females: 0.0021

Covariance(male,female): 0.001