Rethinking the Welfare State

(Preliminary)

Nezih Guner, Remzi Kaygusuz and Gustavo Ventura

ICREA-MOVE, U. Autònoma de Barcelona and Barcelona GSE
Sabanci Universitesi (Turkey)
Arizona State University (USA)

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Motivation

- Inequality of earnings along the life-cycle
  - household structure – married vs. single households, single male vs. single female

- Inequality in earnings versus inequality of consumption over the life-cycle
  - Why? Shock structure, household labor supply, public policy
    - Blundell, Pistaferri, and Saporta-Eksten (2016)

- The role of public policy
  - Progressive taxation
  - Social Security
  - Means-tested tax credits – Earned Income Tax Credit, Child Tax Credit
  - Means-tested transfers – AFDC/TANF, Food Stamps, SSI, Housing, Medicaid
Aiyagari-Bewley-Huggett economies

- Models with heterogeneity
- Agents (typically households with one earner) face idiosyncratic productivity shocks.
- Given these shocks, agents decide how much to consume, how much to save, how much to work to smooth consumption.
- Agents face borrowing constraints
- Labor supply and savings allow agents to smooth their consumption.
- Public policies also help agents to smooth consumption

How well agents are able to smooth their consumption?

What are the role of policy and household decisions?

Judge the extent of insurance looking at the inequality in earnings versus inequality of consumption over the life-cycle

- individual earnings data vs. household level consumption data
What we do

- Documents facts on inequality in earnings and consumption along the life-cycle for different types of individuals and households.

- Develop a life-cycle economy that has the potential to account for these facts:
  - Heterogenous married and single agents
  - Facing idiosyncratic productivity shocks
  - Household labor supply decisions at intensive and extensive margins
  - Progressive taxation of household incomes
  - Means-tested tax benefits and transfers

- Use this framework to evaluate quantitatively:
  1) *Current welfare system*,
  2) A system that replaces current *taxes and transfers* with
     - Proportional income tax
     - Negative income tax
• Current Population Survey (CPS)
  • Household heads and their spouses between ages 25 to 50
  • Drop all top-coded income variables
  • Drop all observations with hourly wage that is less than federal minimum wage
  • Drop if yearly hours is less than 520 hours per year for those above age 30, less than 260 for those below age 30, and all observations more than 5820 hours of work
  • For each individual and household calculate total earnings. Trim bottom 5%

• Estimate

\[ m_{a,t} = \beta'_a D_a + \beta'_t D_t + \varepsilon_{a,t} \]

• Consumption Expenditure Survey (CEX)
  • Compute total non-durable consumption expenditure

• Huggett, Ventura and Yarom (2010), Heathcote, Perri and Violante (2010)
Variance of Log Earnings, Males

Variance of Log Earnings for Males across different age groups.
Variance of Log Earnings, Males

AGE

ALL
MARRIED
SINGLE
Variance of Log Earnings, Females

Age

25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Variance of Log Earnings, Males and Females (All)
Variance of Log Household Earnings

Age

ALL

MARRIED
Correlation of Hours, Husband and Wives

AGE

Correlation: 0.3

ALL
POSITIVE
Correlation of Earnings, Husbands and Wives

AGE

Correlation

ALL

POSITIVE
For males, married or single, variance of log earnings increase non-trivially along the life-cycle.

For females, married or single, we do not observe such increase.

For both married and single households variance of log earnings increase non-trivially along the life-cycle.

- The level of inequality is much lower for married households.

The variance of log consumption increases along the life-cycle.

- But much less than the increase in the variance of household earnings.

The correlation between earnings of husbands and wives is low and slightly U-shaped along the life-cycle.

The correlation between hours of husband and wives is low and slightly U-shaped along the life-cycle.
- **Heterogeneity**
  - Permanent (education)
  - Shocks

- **Married Female Labor Supply**
  - Children
  - Child care costs

- **Policy**
  - Tax credits and transfers conditional on income and number of children

- **General Equilibrium**
  - Guner, Kaygusuz, and Ventura (2012a, 2012b, 2015)
    - Taxation of secondary earners
    - Gender-based taxation
    - Child-care subsidies
Model – Demographics and Heterogeneity

- Life-cycle economy, \( j = 1, \ldots, J_R, \ldots, J \). [25,26,\ldots,65,\ldots,80]

- Males (\( m \)) and females (\( f \)), differ in their types/education.
  - Male types, \( z \in Z \). Map into productivity profiles, \( \omega_m(z,j) \).
  - Female types, \( x \in X \). Map into initial productivity levels, \( h_1 = \eta(x) \), and after age 1, \( h \) evolves endogenously.

- Agents can be single or married. Marital status is exogenous, and does not change over the life-cycle.
• Married households and single females differ in terms of the number of children attached to them.
  • Three possibilities: without, early, late

• If a female with children works, married or single, then the household has to pay for child care costs.

• Young (age 1) children imply a time cost for mothers, $\nu$
  • Children do not provide any utility.

• Joint market work for married couples also implies a utility cost, $q$
  • Residual heterogeneity in labor force participation.
Female types, $x \in X$. These types map into initial productivity levels, $h_1 = \eta(x)$, and after age 1, $h$ evolves endogenously.

After age 1, labor market productivity of females evolves endogenously – Attanasio, Low, Sanchez-Marcos 2008

$$h' = \exp[\ln h + \alpha_j \chi(l) - \delta (1 - \chi(l))],$$

where $\chi(l)$ is an indicator function for $l > 0$ (hours worked by females).

In the current simulations, $\delta \equiv 0$.

Given costs (children and utility cost of joint work) and benefits (earnings plus human capital accumulation), females decides whether to work or not.
Model – Idiosyncratic Productivity Shocks

- Note that agents differ by their types (education)
- For an age-$j$ single male of type $z$, earnings are given by

\[
\text{wage} \cdot \omega(j, z) \cdot \exp(\eta_{j}^{s,m}) \cdot \text{labor supply},
\]

where $\omega(z, j)$ is the age-earning profile given $z$, $\eta_{j}^{s,m}$ is a persistent shock.
- For $j > 1$, the persistent shock is governed by an AR(1) process

\[
\eta_{j+1}^{s,m} = \rho_{s,m} \eta_{j}^{s,m} + \varepsilon_{j+1}^{s,m},
\]

with $\varepsilon_{j+1}^{s,m} \sim N(0, \sigma_{\varepsilon}^{2})$.
- The initial value at the start of the life cycle is a draw from a normal distribution. Hence,

\[
\eta_{1}^{s,m} \sim N(0, \sigma_{\eta}^{2}).
\]
For a single female of age-\(j\) who has human capital \(h_j\), earnings are given by

\[
\underbrace{w}_{\text{wage}} \times \underbrace{h_j \times \exp(\eta_{j}^{s,f})}_{\text{labor endowment}} \times \underbrace{l_f}_{\text{labor supply}}
\]

For \(j > 1\), let

\[
\eta_{j+1}^{s,f} = \rho_{s,f} \eta_{j}^{s,f} + \varepsilon_{j+1}^{s,f}
\]

with \(\varepsilon_{j+1}^{s,f} \sim N(0, \sigma_{\varepsilon_{s,f}}^2)\).

Again, the initial value at the start of the life cycle is a draw from a normal distribution. Hence,

\[
\eta_{1}^{s,f} \sim N(0, \sigma_{\eta_{1}^{s,f}}^2)
\]
Married couples

\[ w \times h_j \times \exp(\eta_{\text{j}}^{m,f}) \times w \times l_f + w \times \omega(j, z) \times \exp(\eta_{\text{j}}^{m,m}) \times l_m, \]

For \( j > 1 \), the bivariate AR(1) process is

\[ \eta_{\text{j}+1}^{m,m} = \rho_{m,m} \eta_{\text{j}}^{m,m} + \varepsilon_{\text{j}+1}^{m,m} \text{ and } \eta_{\text{j}+1}^{m,f} = \rho_{m,f} \eta_{\text{j}}^{m,f} + \varepsilon_{\text{j}+1}^{m,f} \]

with

\[ (\varepsilon_{\text{j}+1}^{m,m}, \varepsilon_{\text{j}+1}^{m,f}) \sim N \left( 0, \begin{bmatrix} \sigma_{\varepsilon,m,m}^2 & \sigma_{\varepsilon,f,m} \\ \sigma_{\varepsilon,m,f} & \sigma_{\varepsilon,f,f}^2 \end{bmatrix} \right), \]

Initial values for persistent shocks for couples are draws from a bivariate normal distribution, with correlation. Therefore,

\[ (\eta_{\text{1}}^{m,m}, \eta_{\text{1}}^{m,f}) \sim N \left( 0, \begin{bmatrix} \sigma_{\eta,1,m,m}^2 & \sigma_{\eta,1,m,f} \\ \sigma_{\eta,1,m,f} & \sigma_{\eta,1,f,f}^2 \end{bmatrix} \right). \]
Model – Idiosyncratic Productivity Shocks

- **Parameters (persistence, innovation, initial shocks)**
  - Single males: $\rho_{s,m}, \sigma^2_{\varepsilon,sm}, \eta^2_s, \eta^2_{1s,}\sigma^2_{\eta_1}$
  - Single females: $\rho_{s,f}, \sigma^2_{\varepsilon,sf}, \eta^2_{sf}$
  - Married: $\rho_{m,m}, \rho_{m,f}, \sigma^2_{\varepsilon,mf}, \sigma^2_{\varepsilon,mm}, \sigma^2_{\varepsilon,\eta_1}, \sigma^2_{\eta_1,mf}, \sigma^2_{\eta_1,\eta_1}$

- **For now, we assume that** $\rho_{s,m} = \rho_{s,f} = \rho_{m,m} = \rho_{m,f} = \rho$.

- **For now, also assume that** $\sigma^2_{\varepsilon,sm} = \sigma^2_{\varepsilon,sf} = \sigma^2_{\varepsilon,mm} = \sigma^2_{\varepsilon,mf} = \sigma^2_{\varepsilon}$.

- **Parameters:** $\{ \rho, \sigma^2_\varepsilon, \sigma^2_{\varepsilon,f}, \sigma^2_{\varepsilon,m}, \sigma^2_{\eta_1,s,}, \sigma^2_{\eta_1,f}, \sigma^2_{\eta_1,m}, \sigma^2_{\eta_1,mf}, \sigma^2_{\eta_1,\eta_1} \}$
Model – Preferences

- Single female

\[ U_f^S (c, l, k_y) = \log(c) - B(l + k_y \alpha) \left(1 + \frac{1}{\gamma}\right), \]

where \( k_y \in \{0, 1\} \) is an indicator for young (age-1) children.

- Single male

\[ U_m^S (c, l) = \log(c) - B(l)^{1+\frac{1}{\gamma}}. \]

- Married female

\[ U_f^M (c, l_f, q, k_y) = \log(c) - B(l_f + k_y \alpha)^{1+\frac{1}{\gamma}} - \frac{1}{2} \chi \{l_f\} q, \]

- Married male

\[ U_m^M (c, l_m, l_f, q) = \log(c) - Bl_m^{1+\frac{1}{\gamma}} - \frac{1}{2} \chi \{l_f\} q. \]

Note: \( \gamma = 0.4 \) is same for males and females.
Model – Government

- **Income tax functions** $T^M(I, k)$ and $T^S(I, k)$
  - These functions are continuous in $I$, increasing and convex.
  - $k$ is an indicator for children.

Income tax functions:

$$
\text{average tax rate (income)} = \eta_1 + \eta_2 \log \text{(income)} + \varepsilon,
$$

- We estimate these functions from Internal Revenue Service (IRS) micro data – Guner, Kaygusuz and Ventura (2014)

- Besides the income and payroll taxes, each household pays an additional flat capital income tax for the returns from his/her asset holdings, $\tau_k$.

- There is a social security system financed by a flat payroll tax, $\tau_p$
  - Social Security payments are indexed by agents’ initial types (education)
Earned Income Tax Credit (EITC) and Child Tax Credit (CTC)

Model them exactly as they are in the tax code

Transfers

Survey of Income and Program Participation (SIPP), 1995-2013

Estimate effective transfer functions.

Include AFDC/TANF, SSI, Food Stamps/SNAP, WIC

Total transfer functions $TR^M(I, k)$ and $TR^S(I, k)$
Decision Problem – Married Households

- Let $\theta = (x, z, q, b)$

\[
V^M(a, h, \eta_{j}^{m,f}, \eta_{j}^{m,m}; \theta, j) = \max_{a', l_f, l_m} \left\{ \left[ U_f^M(c, l_f, q, k_y) + U_m^M(c, l_m, l_f, q) \right] + \beta EV^M(a', h', \eta_{j}^{m,f'}, \eta_{j}^{m,m'}; \theta, j + 1) \right\},
\]

subject to (with kids)

\[
c + a' + \underbrace{d\chi(l_f)}_{\text{child care costs}} = a(1 + r(1 - \tau_k)) + w(\omega_m(z, j)l_m + hl_f)(1 - \tau_p) - T^M(w\omega_m(z, j)l_m + whl_f + ra, 1) + TR^M(w\omega_m(z, j)l_m + whl_f + ra, 1)
\]

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Quantitative Analysis - Demographics and Heterogeneity, taken from the data

- **Wage profiles of males**
  - Four types: less than or equal to high school (hs), some college (sc), college (col) and post-college (col+)

- **Initial wages for females**
  - Four types: hs, sc, col, col+

- **Demographic structure**
  - Marital status, about 74% of people are married
  - Who is married with whom, about 50% of people marry someone of their own type
  - Child bearing status, high types (col or col+) are more likely to be childless or have their children late
To calibrate human capital process

\[ h' = G(x, h, l, j) = \exp \left[ \ln h + \alpha_j^x \chi(l) \right]. \]

Then, we select \( \alpha_j^x \) so that if a female of a particular type \( x \) works in every period, her wage profile has exactly the same shape as males.

- select these parameters before we run the model
Figure A1: Labor Productivity Levels by Education, Males

![Graph showing labor productivity levels by education and age for males][1]

**Legend:**
- <HS
- HS
- SC
- C
- C+
Tax Functions

Household Income (as a fraction of mean household income)

- married, 2 children
- single, 2 children
We assume that the utility cost parameter is distributed according to a (flexible) gamma distribution, $\zeta(q|z)$.

Choose the parameters to match LFP for married females, ages 25-54.

<table>
<thead>
<tr>
<th>Married Female LFP, 25-54</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DATA</strong></td>
</tr>
<tr>
<td>Males</td>
</tr>
<tr>
<td>hs</td>
</tr>
<tr>
<td>sc</td>
</tr>
<tr>
<td>col</td>
</tr>
<tr>
<td>col+</td>
</tr>
</tbody>
</table>
Figure 1: Taxes and Labor Force Participation of Secondary Earners

- The graph illustrates the relationship between taxes and labor force participation of secondary earners.
- The upward trend indicates an increase in labor force participation with higher values of $q$.
- The downward trend represents the decrease in labor force participation with lower values of $q$. 

Key points:
- $V_1$ and $V_2$ are the tax rates for different levels of labor force participation.
- $V_1'$ and $V_2'$ are the marginal tax rates.
- $q^*$ and $q''$ represent critical points for labor force participation.
- The shaded area signifies an increase in labor force participation.
Quantitative Analysis – Shocks

- 7 parameters: \( \{ \rho, \sigma_{\varepsilon}, \sigma_{\rho_{\varepsilon}^m}, \sigma_{\eta^s_{m}}, \sigma_{\eta^s_{f}}, \sigma_{\eta^m_{m}}, \sigma_{\eta^m_{f}}, \sigma_{\eta^m_{m} \eta^m_{f}} \} \)

- \( \rho = 0.958 \) – Kaplan (2012)

- \( \sigma^2_{\varepsilon} = 0.011 \) – var. of log earnings, all males.

- \( \sigma_{\rho_{\varepsilon}^m} = 0.034 \) – corr. of earnings b/w hus. and wives, 45-54

- \( \sigma_{\eta^s_{m}} = 0.21 \) – var. of log earnings, single males, 25-29

- \( \sigma_{\eta^s_{f}} = 0.24 \) – var. of log earnings, single females, 25-29

- \( \sigma_{\eta^m_{m}} = \sigma_{\eta^m_{f}} = 0.11 \) – var. of earnings, married males, 25-29

- \( \sigma_{\eta^m_{m} \eta^m_{f}} = 0.042 \) – cor. of earnings b/w hus. and wives, 25-29
<table>
<thead>
<tr>
<th>Statistic</th>
<th>Data</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Output Ratio</td>
<td>2.93</td>
<td>2.97</td>
</tr>
<tr>
<td>Labor Hours Per-Worker</td>
<td>0.40</td>
<td>0.4</td>
</tr>
<tr>
<td>LFP of Married Females with Young Children (%)</td>
<td>62.6</td>
<td>60.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LFP of Married Females (%) , 25-54</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td>61.8</td>
<td>61.1</td>
</tr>
<tr>
<td>Some College</td>
<td>74.0</td>
<td>73.1</td>
</tr>
<tr>
<td>College</td>
<td>74.9</td>
<td>76.6</td>
</tr>
<tr>
<td>More than College</td>
<td>81.9</td>
<td>80.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>72.2</th>
<th>70.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Children</td>
<td>68.3</td>
<td>66.6</td>
</tr>
<tr>
<td>Without Children</td>
<td>85.9</td>
<td>79.5</td>
</tr>
</tbody>
</table>
### Taxes and Transfers

(households with children)

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Married</th>
<th>Single Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment per recipient ($)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EITC</td>
<td>2796</td>
<td>3429</td>
</tr>
<tr>
<td>CTC</td>
<td>2144</td>
<td>1848</td>
</tr>
<tr>
<td>Transfers</td>
<td>883</td>
<td>2074</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Share of Recipients</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EITC</td>
<td>7.7%</td>
<td>7.5%</td>
</tr>
<tr>
<td>CTC</td>
<td>31.9%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Transfers</td>
<td>18.8%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

Total Spending/GDP 1.2%
Total Transfers (as a fraction of mean household income)
Var of Log Earnings, All Males

Model vs Data

AGE

25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Var of Log Earnings, Married Females

Model

Data

AGE
Var of Log Earnings, Households

AGE

ALL-model
ALL-data
MARRIED-model
MARRIED-data
Variance of Log Consumption, all households
Correlation of Earnings, Husbands and Wives

Model vs Data

Age
Benchmark Economy

- Captures the rise in earnings inequality for males
- Captures some of the rise in earnings inequality for all households
- More work is need for females.
- Does a very good job generating the rise in consumption inequality
- Does an OK job for correlations of earnings and hours between husbands and wives

To do:
- better match
- understand the mechanism behind the relation between earnings and consumption inequality
Model – Idiosyncratic Productivity Shocks

- **Parameters (persistence, innovation, initial shocks)**
  - Single males: \( \rho_{s,m}, \sigma^2_{\varepsilon_{s,m}}, \sigma^2_{\eta_1^{s,m}} \)
  - Single females: \( \rho_{s,f}, \sigma^2_{\varepsilon_{s,f}}, \sigma^2_{\eta_1^{s,f}} \)
  - Married: \( \rho_{m,m}, \rho_{m,f}, \sigma^2_{\varepsilon_{m,f}}, \sigma^2_{\varepsilon_{f,m}}, \sigma^2_{\eta_1^{m,m}}, \sigma^2_{\eta_1^{m,f}}, \sigma^2_{\eta_1^{f,m}} \)

- **For now, we assume that** \( \rho_{s,m} = \rho_{s,f} = \rho_{m,m} = \rho_{m,f} = \rho \).

- **For now, also assume that** \( \sigma^2_{\varepsilon_{s,m}} = \sigma^2_{\varepsilon_{s,f}} = \sigma^2_{\varepsilon_{m,f}} = \sigma^2_{\varepsilon_{f,m}} = \sigma^2_{\varepsilon} \).

- **Parameters:** \( \{ \rho, \sigma^2_{\varepsilon}, \sigma_{\varepsilon f m}, \sigma^2_{\eta_1^{s,m}}, \sigma^2_{\eta_1^{s,f}}, \sigma^2_{\eta_1^{m,m}} = \sigma^2_{\eta_1^{m,f}}, \sigma_{\eta_1^{m} \eta_1} \} \)
Role of the Welfare System

- Shut down transfers
  - revenue neutral, a proportional tax rate of -0.35%

- Shut down tax credits
  - revenue neutral, a proportional tax rate of -1.3%
## Married Female LFP

% Change from Benchmark Economy

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
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<th>Females</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>hs</td>
<td>sc</td>
<td>col</td>
<td>col+</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hs</td>
<td>2.8</td>
<td>2.0</td>
<td>1.0</td>
<td>0.3</td>
</tr>
<tr>
<td>sc</td>
<td>2.0</td>
<td>1.1</td>
<td>0.6</td>
<td>0.2</td>
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<tr>
<td>col</td>
<td>1.3</td>
<td>0.7</td>
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<td>0.1</td>
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<tr>
<td>col+</td>
<td>1.2</td>
<td>0.7</td>
<td>0.6</td>
<td>0.3</td>
</tr>
</tbody>
</table>
• Replace all taxes and transfers with a **proportional tax**
  • Revenue neutral
  • **Tax rate is 9.6%**

• Replace all taxes and transfers with a **Negative Income Tax (NIT)**
  • Each person receives a transfer of 2.5% of mean household income in the benchmark economy (about 6800$ for a married family with two children)
  • Each household faces a proportional income tax
  • Revenue neutral
  • **Tax rate is 16.3%**

• Open Economy
Large effects on female labor supply and output from a proportional income tax
## % Change from Benchmark Economy

<table>
<thead>
<tr>
<th>PROP.</th>
<th>Females</th>
<th></th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>hs</td>
<td>sc</td>
<td>col</td>
</tr>
<tr>
<td></td>
<td>15.8</td>
<td>10.2</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>8.5</td>
<td>5.2</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>4.3</td>
<td>3.5</td>
<td>1.6</td>
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<tr>
<td></td>
<td>7.6</td>
<td>5.6</td>
<td>4.7</td>
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<tr>
<td></td>
<td>hs</td>
<td>sc</td>
<td>col</td>
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<tr>
<td></td>
<td>5.3</td>
<td>3.9</td>
<td>1.7</td>
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<td></td>
<td>3.2</td>
<td>1.6</td>
<td>0.8</td>
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<td></td>
<td>1.7</td>
<td>1.2</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>1.8</td>
<td>1.8</td>
</tr>
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</table>

- Large effects on female labor supply and output from a proportional income tax
### Welfare – Steady States

- **Aggregate Welfare:** -3.1%
- **Winning households:** 51%

#### Steady State Welfare Gains and Losses

**Proportional Income Tax**

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Married</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Fem.</td>
</tr>
<tr>
<td></td>
<td>hs</td>
<td>sc</td>
</tr>
<tr>
<td>hs</td>
<td>1.4</td>
<td>-19.0</td>
</tr>
<tr>
<td>sc</td>
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<td>-11.3</td>
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<td>-2.0</td>
</tr>
<tr>
<td>col+</td>
<td>5.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Note: Positive values indicate gains, negative values indicate losses.
### Aggregate Welfare: -1.5%

### Winning households: 33.5%

#### Steady State Welfare Gains and Losses

**Negative Income Tax**

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Fem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>hs</td>
<td>0.2</td>
<td>-8.7</td>
</tr>
<tr>
<td>sc</td>
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<td>-6.5</td>
</tr>
<tr>
<td>col</td>
<td>-0.7</td>
<td>-3.1</td>
</tr>
<tr>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>hs</th>
<th>sc</th>
<th>col</th>
<th>col+</th>
</tr>
</thead>
<tbody>
<tr>
<td>husband/wife</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hs</td>
<td>-2.5</td>
<td>-1.4</td>
<td>0.0</td>
<td>1.9</td>
</tr>
<tr>
<td>sc</td>
<td>-1.2</td>
<td>-0.5</td>
<td>0.6</td>
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</tr>
<tr>
<td>col</td>
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<td>0.8</td>
<td>1.6</td>
<td>3.0</td>
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<tr>
<td>col+</td>
<td>1.4</td>
<td>1.8</td>
<td>2.5</td>
<td>3.9</td>
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</table>
Conclusions

- Documents facts on inequality in earnings and consumption along the life-cycle for different types of individuals and households.

- Develop a life-cycle economy that has the potential to account for these facts.

- Use this framework to evaluate quantitatively:
  - the current welfare system
  - a system that replaces current taxes and transfers with
    - Proportional income tax
    - Negative income tax
We assume that the utility cost parameter is distributed according to a (flexible) gamma distribution, $\zeta(q|z)$.

Choose the parameters to match LFP for married females, ages 25-54.

### Married Female LFP, 25-54

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Males</td>
<td></td>
<td>hs</td>
<td>sc</td>
<td>col</td>
</tr>
<tr>
<td>hs</td>
<td>60.3</td>
<td>75.8</td>
<td>83.8</td>
<td>89.0</td>
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<tr>
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<td>53.6</td>
<td>60.6</td>
<td>62.7</td>
<td>76.7</td>
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<tr>
<td>Total</td>
<td>61.8</td>
<td>74.0</td>
<td>74.9</td>
<td>81.9</td>
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### Social Security Benefits, Singles

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<thead>
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<tr>
<td>hs</td>
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<td>0.914</td>
</tr>
<tr>
<td>sc</td>
<td>1.173</td>
<td>1.059</td>
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<tr>
<td>col</td>
<td>1.213</td>
<td>1.067</td>
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<tr>
<td>col+</td>
<td>1.291</td>
<td>1.066</td>
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</table>

### Social Security Benefits, Married Couples

<table>
<thead>
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<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>hs</td>
<td>1.755</td>
<td>1.874</td>
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<tr>
<td>sc</td>
<td>1.888</td>
<td>1.996</td>
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<tr>
<td>col</td>
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<td>2.057</td>
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<tr>
<td>col+</td>
<td>2.033</td>
<td>2.110</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>hs</td>
<td>1.969</td>
</tr>
<tr>
<td>sc</td>
<td>2.141</td>
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<tr>
<td>col</td>
<td>2.200</td>
</tr>
<tr>
<td>col+</td>
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</table>