QUANTIFYING EFFICIENT TAX REFORM

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Questions

• How large are welfare gains from efficient tax reform?
  ◦ Baseline: positive economy matched to data
  ◦ Reform: Pareto improvements on efficient frontier

• How sensitive is the answer to modeling choices?
Approach

• Solve equilibria for positive economy
  ○ Inputs: fiscal policy and wage processes
  ○ Outputs: values under current policy

• Solve planner problem next
  ○ Inputs: values under current policy
  ○ Outputs: labor and savings wedges and welfare gains

• Ultimate goal: use results to inform policy reform
Positive Economy

- Small open economy
- Overlapping generations
- Household heterogeneity in:
  - Age
  - Education (permanent type)
  - Productivity (private, stochastic)
- Taxes on consumption, labor income, assets
- Estimated with administrative data for the Netherlands
Reform Problem

- Key inputs from positive economy
  - Parameters of preferences and technologies
  - Wage profiles and shock processes
  - Values under current policy

- Compute maximum consumption equivalent gain
Main Findings

- Maximum consumption equivalent gains:
  - 20% for all education groups in baseline
  - 18-23% varying key parameters

- Decomposition:
  - Consumption: level ↑ and dispersion ↓ for all groups
  - Leisure: level ↓ and dispersion ↑ for all groups
Related Literature

- Theory and application of income tax design
  Vast body of work
- Theory behind dynamic taxation and redistribution
  Farhi-Werning (2013), Golosov-Troshkin-Tsyvinski (2016)
- Pareto-improving reforms with fixed types
  Hosseini-Shourideh (2019)
- What’s new?
  - GE analysis linking positive economy to planner
  - Analysis of Pareto reforms with stochastic types
  - Application with administrative data for NL
Outline

- Theory
- Estimation
- Results
Theory
Positive Economy: HH maximization

\[ v_j(a, \epsilon; \Omega) = \max_{c, n, a'} \{ u(c, \ell) + \beta E[v_{j+1}(a', \epsilon'; \Omega)|\epsilon] \} \]

s.t. \[ a' = (1 + r)a - T_a(ra) + w\epsilon n - T_n(j, w\epsilon n) - (1 + \tau_c)c \]

where

\( j = \) age  
\( a = \) financial assets  
\( \epsilon = \) productivity shock  
\( \Omega = \) prices and government policies  
\( c = \) consumption  
\( n = \) labor supply (\( n + \ell = 1 \))
Positive Economy Values

• For simplicity, assume:
  ○ Small open economy with constant prices, policies
  ○ No initial assets

• Then, inputs to planner problem:

$$\vartheta(\epsilon^{j-1}) \equiv E[v_j(a, \epsilon; \Omega)|\epsilon_-]$$

including future generations $$\vartheta(\epsilon_0) \equiv E[v_1(0, \epsilon; \Omega)|\epsilon_0]$$
Pareto Reforms
How to compute this?
Maximize present value of aggregate resources

subject to

- Incentive constraints for every household and history
- Value delivered exceeds $\vartheta(\epsilon^{j-1})$
Planner Problem in Practice

- Exploit separability to solve household by household

- Include only local downward incentive constraints
  - Verify numerically that all ICs satisfied

- Solve recursively by introducing additional states:
  - $V = \text{promised value for truth telling}$
  - $\tilde{V} = \text{threat value for local lie}$
Planner Problem for a Household
Planner Problem for a Household

Max present value of household resources
Planner Problem for a Household

\[
\Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ w \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \right] \\
+ \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R
\]
Planner Problem for a Household

\[ \Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i|\epsilon_-) \left[ w_{\epsilon_i} n_j(\epsilon_i) - c_j(\epsilon_i) \right] \]

\[ + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i)/R \]

s.t.  Local downward incentive constraints
Planner Problem for a Household

\[ \Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ w_\epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \right] \\
+ \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R \]

s.t. \[ U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \]

\[ \geq U(c_j(\epsilon_{i-1}), \ell^+_j(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \ i \geq 2 \]

where \( \ell^+_j(\epsilon_{i-1}) = 1 - n_j(\epsilon_{i-1}) \epsilon_{i-1} / \epsilon_i \)
Planner Problem for a Household

\[ \Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) [w \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \] 
\[ + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R] \]

s.t. \[ U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \]
\[ \geq U(c_j(\epsilon_{i-1}), \ell_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \ i \geq 2 \]

Deliver at least the promised value
Planner Problem for a Household

$$\Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ \omega \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \right]$$

$$+ \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R$$

s.t.  
$$U(c_j(\epsilon_i), l_j(\epsilon_i)) + \beta V_j(\epsilon_i)$$

$$\geq U(c_j(\epsilon_{i-1}), l_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \ i \geq 2$$

$$V_- \leq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ U(c_j(\epsilon_i), l_j(\epsilon_i)) + \beta V_j(\epsilon_i) \right]$$
Planner Problem for a Household

\[ \Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ w \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \right. \]

\[ \left. + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R \right] \]

s.t. \[ U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \geq U(c_j(\epsilon_{i-1}), \ell_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \quad i \geq 2 \]

\[ V_- \leq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \right] \]

Deliver no more than the threat value
Planner Problem for a Household

\[ \Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i|\epsilon_-) \left[ w_{\epsilon_i} n_j(\epsilon_i) - c_j(\epsilon_i) \right. \]

\[ \left. + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i)/R \right] \]

s.t. \[ U(c_j(\epsilon_i), l_j(\epsilon_i)) + \beta V_j(\epsilon_i) \geq U(c_j(\epsilon_{i-1}), l_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \ i \geq 2 \]

\[ V_- \leq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i|\epsilon_-) \left[ U(c_j(\epsilon_i), l_j(\epsilon_i)) + \beta V_j(\epsilon_i) \right] \]

\[ \tilde{V}_- \geq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i|\epsilon_+^+) \left[ U(c_j(\epsilon_i), l_j(\epsilon_i)) + \beta V_j(\epsilon_i) \right] \]
Planner Problem for Future Generation \((j = 1)\)

\[
\Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ w \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) \right. \\
\left. + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i) / R \right]
\]

\[
\text{s.t. } U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \\
\geq U(c_j(\epsilon_{i-1}), \ell_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \ i \geq 2
\]

\[
V_- \leq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) \left[ U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \right]
\]

No threat value
Planer Problem for Future Generation \((j = 1)\)

\[
\Pi_j(V_-, \tilde{V}_-, \epsilon_-) \equiv \max \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) [w \epsilon_i n_j(\epsilon_i) - c_j(\epsilon_i) + \Pi_{j+1}(V_j(\epsilon_i), \tilde{V}_j(\epsilon_{i+1}), \epsilon_i)/R]
\]

s.t. \quad U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i) \geq U(c_j(\epsilon_{i-1}), \ell_j^+(\epsilon_{i-1})) + \beta \tilde{V}_j(\epsilon_i), \quad i \geq 2

\[
V_- \leq \sum_{\epsilon_i \in \mathcal{E}} \pi_j(\epsilon_i | \epsilon_-) [U(c_j(\epsilon_i), \ell_j(\epsilon_i)) + \beta V_j(\epsilon_i)]
\]

Replace arbitrary \(V_-\) with \(\vartheta(\epsilon_0) + \vartheta_\Delta\)
Planner Problem Deliverables

- Welfare gains
  - Total consumption equivalent
  - Decomposition

- Wedges
  - Labor
  - Savings
Welfare Gain Decomposition

- If $U(c, \ell) = \gamma \log c + (1 - \gamma) \log \ell$

- Consumption equivalent gain $\Delta$:

  $\log(1 + \Delta) = \log((1 + \Delta^L_c)(1 + \Delta^D_c))$

  $+ (1 - \gamma) \log((1 + \Delta^L_\ell)(1 + \Delta^D_\ell))/\gamma$

  $1 + \Delta^L_x = \sum \pi(\epsilon^j) \hat{x}(\epsilon^j) \over \sum \pi(\epsilon^j)x(\epsilon^j)$,  \(\hat{x}\): planner,  \(x\): positive

  $1 + \Delta^D_x = \sum \beta^j \pi(\epsilon^j) \log \left( \sum \pi(\epsilon^j) \hat{x}(\epsilon^j) \right)$

  $- \sum \beta^j \pi(\epsilon^j) \log \left( \sum \pi(\epsilon^j)x(\epsilon^j) \right)$
Wedges

- Labor wedge:
  \[ \tau_n(\epsilon^j) = 1 - \frac{1}{w} \frac{U_\ell(c(\epsilon^j),\ell(\epsilon^j))}{U_c(c(\epsilon^j),\ell(\epsilon^j))} \]

- Savings wedge:
  \[ \tau_s(\epsilon^j) = 1 - \frac{U_c(c(\epsilon^j),\ell(\epsilon^j))}{\betaRE[U_c(c(\epsilon^j+1),\ell(\epsilon^j+1))|\epsilon^j]} \]
Wedges

- Labor wedge:
  \[ \tau_n(\epsilon^j) = 1 - \frac{1}{w} \frac{U_{\ell}(c(\epsilon^j), \ell(\epsilon^j))}{U_c(c(\epsilon^j), \ell(\epsilon^j))} \]

- Savings wedge:
  \[ \tau_a(\epsilon^j) = 1 - \frac{U_c(c(\epsilon^j), \ell(\epsilon^j))}{\beta RE[U_c(c(\epsilon^{j+1}), \ell(\epsilon^{j+1}))|\epsilon_j]} \]

\[ \rightarrow \] Hopefully informative for reforming current policy
Data
Netherlands

- Merged administrative data, 2006-2014
  - Earnings from tax authority
  - Hours from employer provided data
  - Education from population survey

- National accounts

- Tax schedules
Advantages over US Data

• Administrative data:

  NL:
  Individual earnings linked across HH members
  Individual hours linked across HH members
  Individual education linked across HH members

  US:
  Individual earnings *not* linked across HH members

• Survey data:

  US:
  Years of schooling linked across HH members
  Hours and wages linked across HH members
Estimation of Shock Processes

- Construct hourly wages $W_{ijt}$ ($j=$age, $t=$time)

- Classify degrees:
  - High school or practical (Low)
  - University of applied sciences (Medium)
  - University (High)

- Bin households into 6 groups
  - Assign singles to LL, MM, or HH
  - Use average wage rates for couples

- Construct residual wages $\omega_{ijt}$:

  \[
  \log W_{ijt} = A_t + X_{ijt} + \omega_{ijt}
  \]
Estimation of Shock Processes

• Pool data across cohorts

• Estimate (for each education group):

\[ \omega_{ij} = \epsilon_{ij} + \eta_{ij} \]
\[ \epsilon_{ij} = \rho \epsilon_{ij-1} + u_{ij} \]
\[ \eta_{ij} \sim \mathcal{N}(0, \sigma^2_\eta) \]
\[ u_{ij} \sim \mathcal{N}(0, \sigma^2_u) \]
\[ \epsilon_{i0} \sim \mathcal{N}(0, \sigma^2_{\epsilon_0}) \]

• Apply method of simulated moments:
  
  • Moments: variance, autocovariances of \( \omega_{ij} \)
  
  • Parameters: \( \rho, \sigma_u, \sigma_\eta, \sigma_{\epsilon_0} \)
## Wage Process Estimates

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<th>$\hat{\rho}$</th>
<th>$\hat{\sigma}_u^2$</th>
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<td>.9542</td>
<td>.0096</td>
</tr>
<tr>
<td>Low, Medium</td>
<td>.9660</td>
<td>.0087</td>
</tr>
<tr>
<td>Low, High</td>
<td>.9673</td>
<td>.0162</td>
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<tr>
<td>Medium, Medium</td>
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<tr>
<td>Medium, High</td>
<td>.9616</td>
<td>.0109</td>
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<tr>
<td>High, High</td>
<td>.9564</td>
<td>.0172</td>
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</table>
Wage Profiles

![Wage Profiles Graph](image_url)

- HH
- MH
- MM
- LH
- LM
- LL

Normalized wage profile vs Age

- Y-axis: Normalized wage profile
- X-axis: Age

Graph shows the wage profiles across different ages for various categories.
Other Key Parameters

- Number of types $\epsilon_i \in \mathcal{E}$
- Preferences
- Status quo policy

Baseline: 20 types, log preferences, NL wages & policy
Baseline Results
Labor Wedge
Higher distortions with age in part because opportunity to promise future payoffs wanes.

Higher distortions with overall wage variance in part because IC multipliers tighten as planner provides more insurance.
Welfare

- Consumption equivalent gain of 20%

- Welfare decomposition:
  - Consumption: level ↑ and dispersion ↓ for all groups
  - Leisure: level ↓ and dispersion ↑ for all groups
### Welfare Contributions ($\Delta = 20\%$)

<table>
<thead>
<tr>
<th>Education group</th>
<th>Consumption</th>
<th>Leisure</th>
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<td>$\Delta^L_c$</td>
<td>$\Delta^D_c$</td>
<td>$\Delta^L_\ell$</td>
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<tr>
<td>Low, Low</td>
<td>27</td>
<td>2</td>
<td>-8</td>
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<td>25</td>
<td>7</td>
<td>-11</td>
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<tr>
<td>High, High</td>
<td>21</td>
<td>17</td>
<td>-14</td>
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Welfare Contributions ($\Delta = 20\%$)

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<td>$\Delta_c^D$</td>
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<td>Low, Low</td>
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<td>2</td>
</tr>
<tr>
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<td>25</td>
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</tr>
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<td>Low, High</td>
<td>20</td>
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<td>Medium, Medium</td>
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</tr>
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<td>25</td>
<td>7</td>
</tr>
<tr>
<td>High, High</td>
<td>21</td>
<td>17</td>
</tr>
</tbody>
</table>

Find significant gains for level increase in consumption
Intuition using Static Problem

- No insurance:

\[
\begin{align*}
\max & \quad \gamma \log c + (1 - \gamma) \log \ell \\
\text{s.t.} & \quad c = (1 - \tau(\epsilon))w\epsilon(1 - \ell)
\end{align*}
\]
Intuition using Static Problem

- No insurance:

$$\max \gamma \log c + (1 - \gamma) \log \ell$$

s.t. $c = (1 - \tau(\epsilon))w\epsilon(1 - \ell)$

$\Rightarrow$ variation in consumption, constant leisure
Intuition using Static Problem

• No insurance:

\[
\max \; \gamma \log c + (1 - \gamma) \log \ell \\
\text{s.t. } c = (1 - \tau(\epsilon))w\epsilon(1 - \ell) \\
\Rightarrow \; c(\epsilon) = \gamma w(1 - \tau(\epsilon))\epsilon, \; \ell(\epsilon) = 1 - \gamma
\]
Intuition using Static Problem

- No insurance:

  \[
  \max \gamma \log c + (1 - \gamma) \log \ell \\
  \text{s.t. } c = (1 - \tau(\epsilon))w\epsilon(1 - \ell) \\
  \Rightarrow c(\epsilon) = \gamma w(1 - \tau(\epsilon))\epsilon, \ell(\epsilon) = 1 - \gamma
  \]

- Full insurance:

  \[
  \max \int [\gamma \log c(\epsilon) + (1 - \gamma) \log \ell(\epsilon)]dF(\epsilon) \\
  \text{s.t. } \int [c(\epsilon) - (1 - \tau(\epsilon))w\epsilon(1 - \ell(\epsilon))]dF(\epsilon) \leq 0
  \]
Intuition using Static Problem

- No insurance:

  \[
  \max \gamma \log c + (1 - \gamma) \log \ell
  \]

  s.t. \( c = (1 - \tau(\epsilon))w\epsilon(1 - \ell) \)

  \[\Rightarrow c(\epsilon) = \gamma w(1 - \tau(\epsilon))\epsilon, \ell(\epsilon) = 1 - \gamma\]

- Full insurance:

  \[
  \max \int [\gamma \log c(\epsilon) + (1 - \gamma) \log \ell(\epsilon)]dF(\epsilon)
  \]

  s.t. \( \int [c(\epsilon) - (1 - \tau(\epsilon))w\epsilon(1 - \ell(\epsilon))]dF(\epsilon) \leq 0 \)

  \[\Rightarrow\] constant consumption, variation in leisure
Intuition using Static Problem

- No insurance:

\[
\max \gamma \log c + (1 - \gamma) \log \ell
\]
\[
\text{s.t. } c = (1 - \tau(\epsilon))w\epsilon(1 - \ell)
\]
\[
\Rightarrow c(\epsilon) = \gamma w(1 - \tau(\epsilon))\epsilon, \ell(\epsilon) = 1 - \gamma
\]

- Full insurance:

\[
\max \int [\gamma \log c(\epsilon) + (1 - \gamma) \log \ell(\epsilon)]dF(\epsilon)
\]
\[
\text{s.t. } \int [c(\epsilon) - (1 - \tau(\epsilon))w\epsilon(1 - \ell(\epsilon))]dF(\epsilon) \leq 0
\]
\[
\Rightarrow c(\epsilon) = \gamma w \int (1 - \tau(\epsilon))\epsilon dF(\epsilon)
\]
\[
\ell(\epsilon) = (1 - \gamma) \int (1 - \tau(\epsilon))\epsilon dF(\epsilon)/((1 - \tau(\epsilon)\epsilon)
\]
Intuition using Static Problem

• No insurance:

\[
\begin{align*}
\text{max } & \gamma \log c + (1 - \gamma) \log \ell \\
\text{s.t. } & c = (1 - \tau(\epsilon))w\epsilon(1 - \ell) \\
\Rightarrow & \quad c(\epsilon) = \gamma w (1 - \tau(\epsilon))\epsilon, \quad \ell(\epsilon) = 1 - \gamma
\end{align*}
\]

• Full insurance:

\[
\begin{align*}
\text{max } & \int [\gamma \log c(\epsilon) + (1 - \gamma) \log \ell(\epsilon)]dF(\epsilon) \\
\text{s.t. } & \int [c(\epsilon) - (1 - \tau(\epsilon))w\epsilon(1 - \ell(\epsilon))]dF(\epsilon) \leq 0 \\
\Rightarrow & \quad c(\epsilon) = \gamma w \int (1 - \tau(\epsilon))\epsilon dF(\epsilon) \\
& \quad \ell(\epsilon) = (1 - \gamma) \int (1 - \tau(\epsilon))\epsilon dF(\epsilon) / ((1 - \tau(\epsilon)\epsilon) \\
\Rightarrow & \quad c \text{ level } \uparrow \& \text{ dispersion } \downarrow, \quad \ell \text{ level } \downarrow \& \text{ dispersion } \uparrow
\end{align*}
\]
A Look Under the Hood: Group LL
Sensitivity

- How do results change with
  - Number of types: $\epsilon_i \in \mathcal{E}$
  - Wage profile: varying or constant over lifecycle
  - Wage process: choices of $\rho, \sigma^2_u$
  - Preferences: $\mu$ in $\log c + \psi[\ell^{1-\mu} - 1]/(1 - \mu)$

- Compare welfare gains and allocations to baseline
Double Number of Types

- No change in total gain: 20%
- Small changes in decomposition for most groups:

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<td>LM</td>
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<td>25/29</td>
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<tr>
<td>HH</td>
<td>21/33</td>
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</table>
Double Number of Types: A Look at LL

- Consumption, level
- Consumption, variance
- Leisure, level
- Leisure, variance
No Wage Growth

- Slightly lower total gain: 18%
- No gain from smoothing consumption:

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No Wage Growth: A Look at LL
Decrease Overall Variance by 2/3

- Slightly lower total gain: 18%

- Smaller gain from smoothing consumption:

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<th>Consumption</th>
<th>Leisure</th>
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<tbody>
<tr>
<td></td>
<td>$\Delta_c^L$</td>
<td>$\Delta_c^D$</td>
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<tr>
<td>LL</td>
<td>27/25</td>
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<td>LM</td>
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<td>4/3</td>
</tr>
<tr>
<td>LH</td>
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<td>11/7</td>
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<tr>
<td>MM</td>
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<tr>
<td>MH</td>
<td>25/24</td>
<td>7/5</td>
</tr>
<tr>
<td>HH</td>
<td>21/23</td>
<td>17/10</td>
</tr>
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Decrease $\sigma_u^2$: A Look at LL
Changing Labor Supply Elasticities

- Work in progress

- Recall $U(c, \ell) = \log c + \psi[\ell^{1-\mu} - 1]/(1 - \mu)$
  - $\mu$ large implies very steep slope near 0
  - Challenge: planner evaluates wide range of $\ell$

- Comparison of gains for perturbations:
  - 23%, $\mu = 0.8$
  - 20%, $\mu = 1.0$
  - 19%, $\mu = 1.1$
Summary

- How large are gains from efficient tax reform? 20%

- How sensitive is answer to modeling choices?
  - Found large gains across all trials
  - Found decomposition sensitive to key parameters
  - But more work needed

- Next step: Using results to inform policy reform