US Top Marginal Tax Rate and Top Bracket Threshold

Source: statistics computed by the author
US Tax/Transfer System, single parent with 2 children, 2009

Gross Earnings (with employer payroll taxes)

Disposable earnings

Welfare:
TANF+SNAP

Tax credits:
EITC+CTC

Earnings after Fed+SSA taxes

45 Degree Line

Source: Federal Govt
above $z$ as depicted on Figure 1. This tax change has two effects on tax revenue. First, there is a mechanical effect, which is the change in tax revenue if there were no behavioural responses, and second, there is a reduction in tax revenue due to reduced earnings through behavioural responses. Let us examine these two effects successively.

- **Mechanical effect.**

  The mechanical effect (denoted by $M$) represents the increase in tax receipts if there were no behavioural responses. A taxpayer with income $z$ (above $\bar{z}$) would pay $(z - z)d\tau$ additional taxes. Therefore, summing over the population above $\bar{z}$ and denoting the mean of incomes above $\bar{z}$ by $z_m$, the total mechanical effect $M$ is equal to

  $$M = [z_m - z]d\tau. \quad (5)$$

- **Behavioural responses.**

  As shown in Figure 1, the tax change can be decomposed into two parts; first, an overall uncompensated increase $d\tau$ in marginal rates (starting from 0 and not just from $z$), second, an overall increase in virtual income $dR = zd\tau$. Therefore, an individual with income $z$ changes its earnings by

  $$dz = -\frac{\partial z}{\partial (1 - \tau)} d\tau + \frac{\partial z}{\partial R} dR = -(\xi^*z - \eta z) \frac{d\tau}{1 - \tau}, \quad (6)$$

  where we have used definitions (1) and (2). The reduction in income $dz$ displayed in equation (6) implies a reduction in tax receipts equal to $\tau dz$. The total reduction in tax receipts due to the behavioural responses is simply the sum of the terms $\tau dz$ over all
FIGURE 2 – Ratio mean income above $z$, $z_m/z$, years 1992 and 1993

Source: Saez (2001), p. 211
Obtaining (15) in the context of the Mirrlees model is possible using the Mirrlees first-order condition. This derivation is presented in the Appendix. This rearrangement of terms of the Mirrlees formula is a generalization of the one developed by Diamond (1998) in the case of quasi-linear utility functions. This method, however, does not show the economic effects which lead to formula (14). Formula (14) can, however, be fruitfully derived directly in terms of elasticities using the same method as in Section 3. The formula is commented in the light of this direct derivation just after the proof.

**Direct proof of Proposition 1.** I consider the effect of the following small tax reform perturbation around the optimal tax schedule. As depicted on Figure 3, marginal rates are increased by an amount $d\tau$ for incomes between $z^*$ and $z^* + dz^*$. I also assume that $d\tau$ is second order compared to $dz^*$ so that bunching (and inversely gaps in the income distribution) around $z^*$ or $z^* + dz^*$ induced by the discontinuous change in marginal rates are negligible. This tax reform has three effects on tax receipts: a mechanical effect, an elasticity effect for taxpayers with income between $z^*$ and $z^* + dz^*$, and an income effect for taxpayers with income above $z^*$.

- **Mechanical effect net of welfare loss.**
  As shown in Figure 3, every taxpayer with income $z$ above $z^*$ pays $d\tau dz^*$ additional taxes which are valued $(1 - g(z))d\tau dz^*$ by the government therefore the overall mechanical

---

17. Revesz (1989) has also attempted to express the optimal non-linear tax formula of Mirrlees in terms of elasticities. His derivation is similar in spirit to the one presented in the Appendix.
FIGURE 4 – Hazard Ratio $(1-H(z))/(zh(z))$, years 1992 and 1993

Source: Saez (2001), p. 219
FIGURE 5 – Optimal Tax Simulations

Utilitarian Criterion, Utility type I

Rawlsian Criterion, Utility type I

Utilitarian Criterion, Utility type II

Rawlsian Criterion, Utility type II

Source: Saez (2001), p. 224
Reform: Increase $\tau_1$ by $d\tau_1$ and $c_0$ by $dc_0=z_1 d\tau_1$

1) Mechanical fiscal cost: $dM=-H_0 dc_0=-H_0 z_1 d\tau_1$
2) Welfare effect: $dW=g_0 H_0 dc_0=g_0 H_0 z_1 d\tau_1$
3) Fiscal cost due to behavioral responses:
   $dB=-dH_0 \tau_1 z_1 = d\tau_1 e_0 H_0 \tau_1/(1-\tau_1) z_1$

Optimal phase-out rate $\tau_1$:
$\frac{dM+dW+dB}{0}$

$\Rightarrow \frac{\tau_1}{(1-\tau_1)} = \frac{(g_0-1)}{e_0}$
Source: revised version of Saez (2002), p. 1050
Introducing a small EITC is desirable for redistribution.
Introducing a small EITC is desirable for redistribution.

Starting from a Means-Tested Program

Participation response saves government revenue

Source: revised version of Saez (2002), p. 1050
Figure 3a: Optimal Tax/Transfer Derivation

Consumption $c$ vs. Wage $w$

$c_0, c_1, c_2$ are consumption levels at different wage levels $w_1, w_2$.

Source: revised version of Saez (2002), p. 1052
Figure 3a: Optimal Tax/Transfer Derivation (assuming $g_1 > 1$)

Consumption $c$
Wage $w$

Fiscal Effect: $-h_1 dc_1 < 0$

Welfare Effect: $h_1 g_1 dc_1 > 0$

Source: revised version of Saez (2002), p. 1052
Figure 3a: Optimal Tax/Transfer Derivation (assuming $g_1 > 1$)

Net Welfare effect: $h_1 dc_1 (g_1 - 1) > 0$

Labor Supply: $dh_1 w_1 \tau_1 < 0$

Source: revised version of Saez (2002), p. 1052
Net Welfare effect: $h_1 dc_1 (g_1 - 1) > 0$

Labor Supply: $dh_1 w_1 \tau_1 < 0$

At the optimum:

$$dh_1 w_1 \tau_1 + h_1 dc_1 (g_1 - 1) = 0$$

implies

$$\tau_1/(1-\tau_1) = (1-g_1)/e_1 < 0$$

Source: revised version of Saez (2002), p. 1052
2. Optimal Tax/Transfer System (no min wage)

Source: Lee and Saez (2008)
2. Set Min wage $\bar{w}=w_1$ and increase $c_1$ by $dc_1$

Consumption $c$

Wage $w$

$c_0$

$c_1 + dc_1$

$c_2$

Welfare Effect $>$ Direct Fiscal Effect if govt values redistribution to low skill workers

Source: Lee and Saez (2008)
2. Desirability of Min Wage with Optimal Taxes

Consumption $c$
Wage $w$
$\bar{w} = w_1$

Welfare Effect $>\$ Direct Fiscal Effect if govt values redistribution to low skill workers

d$c_1 > 0$ makes low skilled job $w_1$ more attractive $\Rightarrow$ would reduce $w_1$ through demand effects

Source: Lee and Saez (2008)
2. Desirability of Min Wage with Optimal Taxes

With min wage set at \( w_1 \), \( dc_1 > 0 \) does not affect labor supply because \( w_1 \) cannot go down.

\[ \text{Æ} \] No indirect fiscal effect
\[ \text{Æ} \] Welfare increases

\[ \text{Welfare Effect} > \text{Direct Fiscal Effect} \]
if govt values redistribution to low skill workers

Source: Lee and Saez (2008)
3. Pareto Improving Policy when $\tau_1 > 0$ and min wage binds

$\tau_1 > 0$ = Tax on low skilled work: $c_1 - c_0 < \bar{w}$

Source: Lee and Saez (2008)
3. Pareto Improving Policy when $\tau_1 > 0$ and min wage binds

Reduce $\bar{w}$ while keeping $c_1$, $c_2$ constant:
No direct fiscal effect of $d\bar{w}$, $dw_2$ as
$h_1d\bar{w} + h_2dw_2 = 0$ (no profits)
and tax = $(\bar{w} - c_1)h_1 + (w_2 - c_2)h_2$

Source: Lee and Saez (2008)
3. Pareto Improving Policy when $\tau_1 > 0$ and min wage binds

Unemployment decreases $\rightarrow$
New Workers better off and pay more taxes $\rightarrow$ Pareto Improvement

Reduce $\bar{w}$ while keeping $c_1$, $c_2$ constant:
No direct fiscal effect of $d\bar{w}$, $dw_2$ as $h_1 d\bar{w} + h_2 dw_2 = 0$ (no profits) and tax = $(\bar{w} - c_1) h_1 + (w_2 - c_2) h_2$

Source: Lee and Saez (2008)
Optimal Top Income Tax Rate (Mirrlees ’71 model)

Disposable Income
\[ c = z - T(z) \]

Market income \( z \)

Top bracket:
Slope \( 1 - \tau \)

Reform:
Slope \( 1 - \tau - d\tau \)

Source: Diamond and Saez JEP'11
Optimal Top Income Tax Rate (Mirrlees ’71 model)

Disposable Income \( c = z - T(z) \)

Mechanical tax increase:
\[ d\tau[ z - z^* ] \]

Behavioral Response tax loss:
\[ \tau dz = - d\tau e z \frac{\tau}{1-\tau} \]

Source: Diamond and Saez JEP'11
Empirical Pareto Coefficient

\[ z^* = \text{Adjusted Gross Income (current 2005 $)} \]

\[ a = \frac{zm}{zm - z^*} \text{ with } zm = \mathbb{E}(z|z > z^*) \]

\[ \alpha = \frac{z^* h(z^*)}{1 - H(z^*)} \]

Source: Diamond and Saez JEP'11
A. Top 1% Income Shares and Top MTR

Source: Piketty, Saez, and Stantcheva NBER'11
B. Top 1% Income Shares and Top MTR

Source: Piketty, Saez, and Stantcheva NBER'11
C. Top 1% and Bottom 99% Income Growth

Source: Piketty, Saez, and Stantcheva NBER'11
A. Top 1% Share and Top Marginal Tax Rate in 1975–9

Source: Piketty, Saez, and Stantcheva NBER'11
B. Top 1% Share and Top Marginal Tax Rate in 2004–8

Source: Piketty, Saez, and Stantcheva NBER'11
A. Changes Top 1% Share and Top Marginal Tax Rate

Source: Piketty, Saez, and Stantcheva NBER'11
B. Growth and Change in Top Marginal Tax Rate

Source: Piketty, Saez, and Stantcheva NBER'11
Disposable Income \(c = z - T(z)\)

Pre-tax income \(z\)

Mechanical tax increase: \(d\tau dz [1-H(z)]\)

Social welfare effect: \(-d\tau dz [1-H(z)] G(z)\)

Behavioral response: \(\delta z = -d\tau e^z/(1-T'(z))\)

\(\rightarrow\) Tax loss: \(T'(z) \delta z h(z) dz\)

\(= -h(z) e^z T'(z)/(1-T'(z)) \int dz d\tau\)

Small band \((z, z+dz)\): slope 1 - \(T'(z)\)

Reform: slope 1 - \(T'(z) - d\tau\)

Source: Diamond and Saez JEP'11
Reform: Increase $\tau_1$ by $d\tau_1$ and $c_0$ by $dc_0=zc_0 d\tau_1$

$g_0 >> 1 \rightarrow$ welfare effect $>>$ mechanical fiscal cost

Source: Diamond and Saez JEP'11
Reform: Increase \( \tau_1 \) by \( d\tau_1 \) and \( c_0 \) by \( dc_0 = z_1 d\tau_1 \)

\( g_0 >> 1 \) \( \rightarrow \) welfare effect >> mechanical fiscal cost

Fiscal cost due to behavioral responses proportional to \( \tau_1/(1-\tau_1) \) and elasticity \( e_0 = (1-\tau_1)/H_0 \frac{dH_0}{d(1-\tau_1)} \)

Optimal phase-out rate \( \tau_1 \): \( \tau_1 = (g_0-1)/(g_0-1+ e_0) \)
Example: if \( g_0 = 3 \) and \( e_0 = 0.5 \), \( \tau_1 = 80\% \)

Source: Diamond and Saez JEP'11
Reform: Increase $\tau_1$ by $d\tau_1$ and $c_0$ by $dc_0 = z_1 d\tau_1$

1) Mechanical fiscal cost: $dM = -H_0 dc_1 = -H_0 z_1 d\tau_1$

2) Welfare effect: $dW = g_0 H_0 dc_1 = g_0 H_0 z_1 d\tau_1$

3) Fiscal cost due to behavioral responses:
   $dB = -dH_0 \tau_1 z_1 = d\tau_1 e_0 H_0 \tau_1 / (1 - \tau_1) z_1$

Optimal phase-out rate $\tau_1$:
$dM + dW + dB = 0$
$\Rightarrow \tau_1 / (1 - \tau_1) = (g_0 - 1) / e_0$
Starting from a positive phasing-out rate $\tau_1 > 0$:

1) Increasing transfers by $dc_1$ at $z_1$ is desirable for redistribution: net effect $(g_1-1)h_1 dc_1 > 0$ if $g_1 > 1$

2) Participation response saves government revenue

\[ \tau_1 z_1 dh_1 = e_1 \tau_1/(1-\tau_1) h_1 dc_1 > 0 \]

→ Win-win reform  …if intensive response is small

Optimal phase-out rate $\tau_1$:

\[ (g_1-1)h_1 dc_1 + e_1 \tau_1/(1-\tau_1) h_1 dc_1 = 0 \]

→ $\tau_1/(1-\tau_1) = (1-g_1)/e_1 < 0$ if $g_1 > 1$
EITC Amount as a Function of Earnings

Earnings ($)

0 5000 10000 15000 20000 25000 30000 35000 40000

Subsidy: 40%
Subsidy: 34%
Phase-out tax: 21%
Phase-out tax: 16%

Source: Federal Govt
Source: Piketty, Thomas, and Emmanuel Saez (2012)
<table>
<thead>
<tr>
<th>Income percentile</th>
<th>Equality of Opportunity</th>
<th>Utilitarian (log-utility)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fraction from low background (=parents below median)</td>
<td>Implied social welfare weight G(z) above each percentile</td>
</tr>
<tr>
<td>z= 25th percentile</td>
<td>44.3%</td>
<td>0.886</td>
</tr>
<tr>
<td>z= 50th percentile</td>
<td>37.3%</td>
<td>0.746</td>
</tr>
<tr>
<td>z= 75th percentile</td>
<td>30.3%</td>
<td>0.606</td>
</tr>
<tr>
<td>z= 90th percentile</td>
<td>23.6%</td>
<td>0.472</td>
</tr>
<tr>
<td>z= 99th percentile</td>
<td>17.0%</td>
<td>0.340</td>
</tr>
<tr>
<td>z= 99.9th percentile</td>
<td>16.5%</td>
<td>0.330</td>
</tr>
</tbody>
</table>

Notes: This table compares optimal marginal tax rates at various percentiles of the distribution (listed by row) using an equality of opportunity criterion (in column (3)) and a standard utilitarian criterion (in column (5)). Both columns use the optimal tax formula $T'(z) = \left[1 - G(z) \right] / \left[1 - G(z) + \alpha(z) * e \right]$ discussed in the text where $G(z)$ is the average social marginal welfare weight above income level $z$, $\alpha(z) = (zh(z)) / (1 - H(z))$ is the local Pareto parameter (with $h(z)$ the density of income at $z$, and $H(z)$ the cumulative distribution), and $e$ the elasticity of reported income with respect to $1 - T'(z)$. We assume $e=0.5$. We calibrate $\alpha(z)$ using the actual distribution of income based on 2008 income tax return data. For the equality of opportunity criterion, $G(z)$ is the representation index of individuals with income above $z$ who come from a disadvantaged background (defined as having a parent with income below the median). This representation index is estimated using the national intergenerational mobility statistics of Chetty et al. (2013) based on all US individuals born in 1980-1 with their income measured at age 30-31. For the utilitarian criterion, we assume a log-utility so that the social welfare weight $g(z)$ at income level $z$ is proportional to $1/(z - T(z))$.

Source: Saez and Stantcheva (2014)
The Phase-In and Phaseout of the EITC

Credit Amount by Marital Status and Number of Children

T(z) is continuous in z

T(z) is
slope 10%
slope 12%
slope 37%
taxable income z
Individual Income Tax

$T(z)$ is continuous in $z$

- slope 10%
- slope 12%
- slope 37%
Marginal Income Tax

$T'(z)$ is a step function

- 10% at taxable income $z$
- 12% at taxable income $z$
- 37% at taxable income $z$
\[ c = z - T(z) \]

after-tax and transfer income

Budget Set

slope \(= 1 - T'(z)\)

\[ c = z - T(z) \]

pre-tax income \(z\)

\[ c = z - T(z) \]

after-tax and transfer income

Budget Set

slope \(= 1 - T'(z)\)

\[ c = z - T(z) \]

pre-tax income \(z\)
$c = z - T(z)$

$\tau_p =$ participation tax rate

$(1 - \tau_p)z$
Labor Supply Theory

\[ l^* = l(w, R) \]

Marshallian Labor Supply

\[ c = wl + R \]

Indifference Curve

\[ c = \text{consumption} \]

slope = \( w \)

R

l

0
$l^c (w, u)$

Labor Supply Theory

$C = \text{consumption}$

utility $u$

slope = $w$

Hicksian Labor Supply
Labor Supply Income Effect

\[ \eta = w \frac{\partial l}{\partial R} \leq 0 \]
Labor Supply Substitution Effect

utility $u$

slope = $w + \Delta w$

slope = $w$

$\varepsilon^c = \frac{w \frac{\partial l^c}{l \partial w}}{l} > 0$

$l^c(w, u)$

$l^c(w + \Delta w, u)$

$c$

$l$ (labor supply)
Uncompensated Labor Supply Effect

\[ \varepsilon^u = \varepsilon^c + \eta \]

- **Income effect:** \( \eta \leq 0 \)
- **Substitution effect:** \( \varepsilon^c > 0 \)
Effect of Tax on Labor Supply

\[ c = z - T(z) \]

- \( T(z) < 0: \) income effect \( l \downarrow \)
- \( T'(z) > 0: \) substitution effect \( l \downarrow \)
- \( T(z) > 0: \) income effect \( l \uparrow \)
- \( T'(z) > 0: \) substitution effect \( l \downarrow \)

Slope = \( 1 - T'(z) \)
Laffer Curve

Tax Revenue $R$

\[ R = \tau \cdot Z(1 - \tau) \]

\[ \tau^* = \frac{1}{1 + e} \text{ with } e = \frac{1-\tau}{Z} \cdot \frac{dZ}{d(1-\tau)} \]
Utilitarianism and Redistribution

\[ u(\frac{c_1 + c_2}{2}) \]

\[ \frac{u(c_1) + u(c_2)}{2} \]
Labor Supply Theory

\[ c = (1 - \tau)z + R \]

Indifference Curves

Marshallian Labor Supply

\[ z(1 - \tau, R) \]
Labor Supply Theory

\[ c = consumption \]

Slope = 1 - \( \tau \)

Hicksian Labor Supply

\[ z^c(1-\tau,u) \]
The diagram illustrates the Labor Supply Income Effect. The equation is:

\[ \eta = (1-t) \frac{\partial z}{\partial R} \leq 0 \]

where \( z \) represents earnings, \( c \) represents consumption, \( R \) represents income, and \( \eta \) represents the labor supply income effect. The diagram shows the change in labor supply as income increases, with \( z(1-\tau, R+\Delta R) \) and \( z(1-\tau, R) \) represent the earnings before and after the income change, respectively.
Labor Supply Substitution Effect

\[ \varepsilon^c = \frac{(1 - \tau)}{z} \frac{\partial z^c}{\partial (1 - \tau)} > 0 \]

\[ z^c(1 - \tau, u) \]

\[ z^c(1 - \tau + d\tau, u) \]
Uncompensated Labor Supply Effect

Slutsky equation: $\varepsilon^u = \varepsilon^c + \eta$

- Income effect: $\eta \leq 0$
- Substitution effect: $\varepsilon^c > 0$
Effect of Tax on Labor Supply

\[ c = z - T(z) \]

- **T(z) < 0**: income effect \( z \downarrow \)
- **T'(z) > 0**: substitution effect \( z \downarrow \)

- **T(z) > 0**: income effect \( z \uparrow \)
- **T'(z) > 0**: substitution effect \( z \downarrow \)

Slope = 1 - T'(z)
Starting from a Means-Tested Program

Disposable income
\[ c = z - T(z) \]
Starting from a Means-Tested Program

Introducing a small EITC is desirable for redistribution if $1 to low paid workers more valued than $1 distributed to all.
Introducing a small EITC is desirable for redistribution
Participation response saves government revenue

Disposable income $c = z - T(z)$

Pre-tax earnings $z$

Starting from a Means-Tested Program

45°
Introducing a small EITC is desirable for redistribution

Starting from a Means-Tested Program
Participation response saves government revenue
Win-Win reform

Disposable income
\[ c = z - T(z) \]

Pre-tax earnings \( z \)

\[ \angle 45^\circ \]
Introducing a small EITC is desirable for redistribution.

Starting from a Means-Tested Program

Participation response saves government revenue

Win-Win reform

If intensive response is small

Disposable income

c = z - T(z)

Pre-tax earnings z

45°
Starting from a means-tested program

Disposable income \( c = z - T(z) \)

Pre-tax earnings \( z \)

\( z^* \)

\( 45^\circ \)

G

0
Reducing generosity of G and phase-out rate is desirable if society puts low weight on zero earners.

Starting from a means-tested program, $1 to zero earners less valued than $1 distributed to all.
Reducing generosity of $G$ and phase-out rate is desirable if society puts low weight on zero earners.

Starting from a means-tested program, reducing generosity of $G$ and phase-out rate saves government revenue.

Labor supply response saves government revenue.

Win-Win reform
Historically, a 70 percent marginal tax rate is not unusual.
The top marginal income tax rates from 1913 to 2018.

1981
Reagan took office

FiveThirtyEight

SOURCE: TAX POLICY CENTER
Table 2: Revealed Social Preferences

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Consumption lover vs. Frugal</td>
<td>Consumption lover &gt; Frugal</td>
<td>Consumption lover = Frugal</td>
<td>Consumption lover &lt; Frugal</td>
<td># obs. = 1,125</td>
</tr>
<tr>
<td></td>
<td>4.1%</td>
<td>74.4%</td>
<td>21.5%</td>
<td></td>
</tr>
<tr>
<td>B. Hardworking vs. leisure lover</td>
<td>Hardworking &gt; Leisure lover</td>
<td>Hardworking = Leisure lover</td>
<td>Hardworking &lt; Leisure lover</td>
<td># obs. = 1,121</td>
</tr>
<tr>
<td></td>
<td>42.7%</td>
<td>54.4%</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>C. Transfer Recipients and free loaders</td>
<td>Disabled person unable to work</td>
<td>Unemployed looking for work</td>
<td>Unemployed not looking for work</td>
<td>Welfare recipient not looking for work</td>
</tr>
<tr>
<td>Average rank (1-4) assigned</td>
<td>1.4</td>
<td>1.6</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>% assigned first rank</td>
<td>57.5%</td>
<td>37.3%</td>
<td>2.7%</td>
<td>2.5%</td>
</tr>
<tr>
<td>% assigned last rank</td>
<td>2.3%</td>
<td>2.9%</td>
<td>25.0%</td>
<td>70.8%</td>
</tr>
</tbody>
</table>

Notes: This table reports preferences for giving a tax break and or a benefit increase across individuals in various scenarios. Panel A considers two individuals with the same earnings, same taxes, and same disposable income but high marginal utility of income (consumption lover) vs. low marginal utility of income (frugal). In contrast to utilitarianism, 74% of people report that consumption loving is irrelevant and 21.5% think the frugal person is most deserving. Panel B considers two individuals with the same earnings, same taxes, and same disposable income but different wage rates and hence different work hours. 54.4% think hours of work is irrelevant and 42.7% think the hardworking low wage person is more deserving. Panel C considers transfer recipients receiving the same benefit levels. Subjects find the disabled person unable to work and the unemployed person looking for work much more deserving than the abled bodied unemployed or welfare recipient not looking for work.
We assume now that the government can increase benefits by $1,000 for some recipients of government benefits.

Which of the following four individuals is most deserving of the $1,000 increase in benefits?

Please drag and drop the four individuals into the appropriate boxes on the left. The upper box, marked 1 should contain the individual you think is most deserving. The box labeled "2" should contain the second most-deserving individual, etc.. Please note that you can put two individuals in the same box if you think that they are equally deserving.

Individual A gets $15,000 per year in Disability Benefits because she cannot work due to a disability and has no other resources.

Individual B gets $15,000 per year in Unemployment Benefits and has no other resources. She lost her job and has not been able to find a new job even though she has been actively looking for one.

Individual C gets $15,000 per year in Unemployment Benefits and has no other resources. She lost her job but has not been looking actively for a new job, because she prefers getting less but not having to work.

Individual D gets $15,000 per year in Welfare Benefits and Food Stamps and has no other resources. She is not looking for a job actively because she can get by living off those government provided benefits.

Source: survey in Saez and Stantcheva (2013)

<table>
<thead>
<tr>
<th>Items</th>
<th>1 = Individual most deserving of a $1,000 benefit increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual A</td>
<td></td>
</tr>
<tr>
<td>Individual B</td>
<td></td>
</tr>
<tr>
<td>Individual C</td>
<td></td>
</tr>
<tr>
<td>Individual D</td>
<td></td>
</tr>
</tbody>
</table>
Which of the following two individuals is most deserving of a $1,000 tax break?

Individual A earns $30,000 per year, by working in two different jobs, 60 hours per week at $10/hour. She pays $6,000 in taxes and nets out $24,000. She is very hard-working but she does not have high-paying jobs so that her wage is low.

Individual B also earns the same amount, $30,000 per year, by working part-time for 20 hours per week at $30/hour. She also pays $6,000 in taxes and hence nets out $24,000. She has a good wage rate per hour, but she prefers working less and earning less to enjoy other, non-work activities.

- Individual A is most deserving of the $1,000 tax break
- Individual B is most deserving of the $1,000 tax break
- Both individuals are exactly equally deserving of the $1,000 tax break

Source: survey in Saez and Stantcheva (2013)
Which of the following two individuals do you think is most deserving of a $1,000 tax break?

Individual A earns $50,000 per year, pays $10,000 in taxes and hence nets out $40,000. She greatly enjoys spending money, going out to expensive restaurants, or traveling to fancy destinations. She always feels that she has too little money to spend.

Individual B earns the same amount, $50,000 per year, also pays $10,000 in taxes and hence also nets out $40,000. However, she is a very frugal person who feels that her current income is sufficient to satisfy her needs.

- Individual A is most deserving of the $1,000 tax break
- Individual B is most deserving of the $1,000 tax break
- Both individuals are exactly equally deserving of the tax $1,000 break

Source: survey in Saez and Stantcheva (2013)
Means-tested Transfers in the US, 1960-2019

Optimal Tax/Transfer Systems

\[ z - T(z) \]

after-tax and transfer income

No taxes/transfers

Optimal tax system with no behavioral responses: 100% redistribution

pre-tax income \( z \)
Optimal Tax/Transfer Systems

- No taxes/transfers
- Optimal tax system with behavioral responses
- Optimal tax system with no behavioral responses: 100% redistribution

Graph showing the relationship between pre-tax income and after-tax and transfer income.
Social Marginal Welfare Weights

- Rawlsian weights
- Utilitarian weights
- Libertarian=equal weights

pre-tax income $z$

g
Social Marginal Welfare Weights

Utilitarian weights

Libertarian=equal weights

Rawlsian weights

pre-tax income $z$

$g$
FIGURE 1
Child Tax Credit, Single Parent
For one child, tax year 2020

Credit for children under age 17  Credit for other dependents

Adjusted gross income

$0 $50,000 $100,000 $150,000 $200,000 $250,000 $300,000

$0 $500 $1,000 $1,500 $2,000 $2,500

Notes: Assumes all income comes from earnings, and child meets all tests to be a CTC-qualifying dependent. Credit for married parents begins to phase out at $400,000 of income. Only citizen children qualify for the $2,000 CTC for children under 17. Noncitizens under age 17 who meet the dependency tests of eligibility can qualify for the credit for dependents over age 17.
Child Tax Credit, Single Parent
For one child, tax year 2021

Notes: Assumes all income comes from earnings, and child meets all tests to be a CTC-qualifying dependent. $3,000 and $3,600 credits are fully refundable; prior law limited refunds to $1,400 out of the maximum $2,000 credit. Credit for married parents first phases out at $150,000 of income until credit reaches pre-2021 level; begins second phase out at $400,000 of income. Only citizen children qualify for the $3,000 and $3,600 credits for children under 18. Noncitizens under age 18 who meet the dependency tests of eligibility can qualify other dependent credit.
Basic income vs. Means-tested transfer

Basic income: give R to all, Tax all earnings z at MTR τ

Means-tested transfer: give R to people with z=0, give R-τ z to people with z in (0,z*), Tax earnings z at MTR τ but only above z*

Budget: \( c = (1-\tau) z + R \)

slope=1-τ

Pre-tax income z

Pre-tax income z
Enrollees paid premiums equal to their insurer’s base price minus an income-varying subsidy paid by the state. Subsidies were set so that enrollee premiums for the lowest-price plan equaled a target “affordable amount.” This target amount was set separately for several bins of income, with discrete changes at 150 percent, 200 percent, and 250 percent of FPL. Panel A of Figure 2 shows the result: enrollee premiums for the cheapest plan vary discretely at these thresholds. For the years 2009–2012 (shown in black), the cheapest plan is free for individuals below 150 percent of FPL and increases to $39 per month above 150 percent FPL, $77 per month above 200 percent FPL, and $116 per month above 250 percent of FPL. In 2013 (shown in gray), these amounts increase slightly to $0/$40/$78/$118. Consistent with the goal of affordability, these premiums were a small share of income. For instance, for a single individual in 2011 (whose FPL equaled $908 per month), these premiums ranged from 0–5 percent of income (specifically, 2.9 percent of income just above 150 percent FPL, 4.2 percent just above 200 percent FPL, and 5.1 percent just above 250 percent FPL).

2011 Plan Options.—We analyze the market in 2009–2013 but focus especially on fiscal year 2011 when the market had a useful vertical structure with plans falling into two groups. In 2011 CommCare imposed a binding cap on insurer prices of $426 per month. Four insurers (BMC HealthNet, Fallon, Neighborhood Health Plan, and Network Health) all set prices within $3 of this cap. The exception was CeltiCare, which set a price of $405 per month. Panel B of Figure 2 shows these

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9 We will use “price” to refer to the pre-subsidy price set by insurers and “premium” to refer to the post-subsidy amount owed by enrollees.
where $Y_b$ is an outcome measure in that income bin $b$, $Inc_b$ is income (as a percent of FPL) at the midpoint of the bin, and $s(b)$ is the income segment on which bin $b$ lies (either 135–150 percent, 150–200 percent, 200–250 percent, or 250–300 percent FPL). Notice that the unit of observation is the income bin, while the slope and intercept coefficients vary flexibly at the segment level. Our outcomes are either measures of plan enrollment shares, or enrollee costs or characteristics. We run all regressions using bin-level data and report robust standard errors.

The key assumption is that the eligible population size is smooth through the income thresholds at which subsidies change (150 percent, 200 percent, and 250 percent FPL). This would be violated if people strategically adjust (or misreport) their income to get just below the thresholds and qualify for a larger subsidy.\footnote{Enrollees were required to show proof of income (e.g., via recent pay stubs) when applying but in theory could adjust hours or misreport self-employment income to get below subsidy thresholds.} While in principle such manipulation would be possible, in our setting the process by which individuals’ reported incomes were translated into the percent of FPL formula for determining subsidies were largely shrouded from the individuals during the application process. Perhaps as a result, we find minimal evidence of any such manipulation (see Section IIID). Moreover, because of the relatively linear patterns we find away from the discontinuity, alternative methods (such as constructing a donut-hole around the discontinuity) would lead to very similar estimates.

\footnote{In addition, there are minor changes in eligibility just above 200 percent FPL (pregnant women and HIV-positive people lose Medicaid eligibility and become eligible for CommCare) that also technically violate the smoothness assumption. This will bias our RD estimate of demand responsiveness to price slightly toward zero, since the eligible population grows just above 200 percent FPL. In sensitivity analysis, we show that our main results are robust to excluding this discontinuity.}