US Top Marginal Tax Rate (Federal Individual Income Tax)

Source: IRS, Statistics of Income Division, Historical Table 23
Source: Computations made by Emmanuel Saez using tax and transfer system parameters.
Source: Piketty, Thomas, and Emmanuel Saez (2012)
21.1 Basic Theory

Indifference curve, $IC_1$

$C_1 = $13,750

$C_2 = $9,625

slope = -12.50

slope = -8.75

$A$
### Substitution versus Income Effect

#### (a) Substitution effect is larger

- **Point A** is where the consumption line intersects the budget constraint (BC) before the tax.
- **Point B** is where the consumption line intersects the budget constraint (BC) after the tax.
- **Point C** is where the consumption line intersects the budget constraint (IC).

#### (b) Income effect is larger

- **Point A** is where the consumption line intersects the budget constraint (BC) before the tax.
- **Point C** is where the consumption line intersects the budget constraint (IC) after the tax.

**Diagram Notes:**
- **IC1** represents the initial indifference curve.
- **IC2** represents the indifference curve after the tax, showing a decrease in the quantity of leisure.
- **IC3** represents the indifference curve after the tax, showing an increase in the quantity of leisure.
- The substitution effect is larger when the budget constraint remains the same, and the income effect is larger when the indifference curve shifts.
20.3 The Laffer Curve

The Laffer Curve illustrates the relationship between tax rate and tax revenues. It shows that there is an optimal tax rate ($\tau^*$) where tax revenues are maximized. Below $\tau^*$, increasing tax rates lead to higher revenues. Above $\tau^*$, increasing tax rates lead to lower revenues as economic incentives are reduced, causing a decrease in labor supply and economic activity.
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
\[ c = z - T(z) \]

Market income \( z \)

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

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

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

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

Source: Diamond and Saez JEP'11
Starting from a Means-Tested Program

Source: revised version of Saez (2002), p. 1050
Introducing a small EITC is desirable for redistribution. 

Starting from a Means-Tested Program

Introducing a small EITC is desirable for redistribution

Source: revised version of Saez (2002), p. 1050
Starting from a Means-Tested Program

Introducing a small EITC is desirable for redistribution

Participation response saves government revenue

Source: revised version of Saez (2002), p. 1050
Figure 1: Earned Income Tax Credit by Number of Children and Filing Status, 2013

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

- Slope 10%
- Slope 15%
- Slope 39.6%
Marginal Income Tax

$T'(z)$ is a step function

- 10% (point)
- 15% (point)
- 39.6% (point)
\[ c = z - T(z) \] after-tax and transfer income

\[ c = z - T(z) \] pre-tax income

Budget Set

slope = 1 - T'(z)

\[ z^* \]

\[ -T(0) \]

pre-tax income \( z \)

45°
$c = z - T(z)$

$\tau_p =$ participation tax rate

$(1 - \tau_p)z$
Laffer Curve

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

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

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

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

\[ 0 \quad c_1 \quad \frac{c_1 + c_2}{2} \quad c_2 \quad \text{consumption } c \]
Effect of Tax on Labor Supply

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

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

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

Slope = 1 - \( T'(z) \)
Labor Supply Theory

\[ l = \text{labor supply} \]

\[ R \]

Slope = \( w \)

Indifference Curves

Budget: \( c = wl + R \)

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

Consumption

Marshallian Labor Supply \( l(w, R) \)

\[ l = \text{labor supply} \]
Minimize cost to reach utility $u$ given slope $w$: Hicksian Labor Supply $l^c(w,u)$

$c = z - T(z)$ consumption

utility $u$

Slope = $w$

Labor Supply Theory
Labor Supply Income Effect

Budget: $c = wl + R$

$c = z - T(z)$
consumption
Labor Supply Income Effect

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

consumption

Budget: \[ c = w_l + R + dR \]

Budget: \[ c = w_l + R \]

\[ l(w, R) \]

labor supply l
Labor Supply Income Effect

\[ l(w,R) \]

\[ \eta = w(\partial l/\partial R) < 0 \]

Budget: \( c = wl + R + dR \)

Budget: \( c = wl + R \)
Labor Supply Substitution Effect

c = z - T(z)
consumption

utility $u$

Slope = $w$

$l^c(w, u)$

Labor supply 1
Labor Supply Substitution Effect

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

consumption

utility \( u \)

slope = \( w + dw \)

\[ \varepsilon^c = (w/l^c) \frac{\partial l^c}{\partial w} > 0 \]

\[ l^c(w, u) \]

\[ l^c(w + dw, u) \]

Labor supply \( l \)
Uncompensated Labor Supply Effect

Budget: \( c = wl + R \)

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

consumption

Labor supply \( l \)
Uncompensated Labor Supply Effect

c = z - T(z)

consumption

slope = w + dw

slope = w

\[ l(w, R) \quad l(w + dw, R) \]
Uncompensated Labor Supply Effect

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

consumption

\[ l(w, R) \quad l(w + dw, R) \]

Labor supply \( l \)

slope = \( w + dw \)

slope = \( w \)

substitution effect: \( \varepsilon^c > 0 \)

\[ \varepsilon^u \]
Uncompensated Labor Supply Effect

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

- Income effect: $\eta \leq 0$
- Substitution effect: $\varepsilon^c > 0$

$c = z - T(z)$

Consumption

Labor supply $l$
Basic income vs. Means-tested transfer

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

**Basic income**: give \( R \) to all, Tax all earnings \( z \) at MTR \( \tau \)

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

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

\( z^* = \frac{R}{\tau} \)
Effect of Taxes/Transfers on Labor Supply

c = z - T(z)  

-disposable income

T(z) < 0: income effect: z decreases

T'(z) > 0: substitution effect: z decreases

Net effect: z decreases

T(z) > 0: income effect: z increases

T'(z) > 0: substitution effect: z decreases

Net effect on z is ambiguous

slope = 1 - T'(z)

z*

pre-tax earnings z

0

45°
Effect of Taxes/Transfers on Labor Supply

c = z - T(z)  

disposable income

slope = 1 - T'(z)

pre-tax earnings z
Effect of Taxes/Transfers on Labor Supply

$z^* < z < z^*$

$c = z - T(z)$

disposable income

$T(z) < 0$: income effect: $z$ decreases

$T'(z) > 0$: substitution effect: $z$ decreases

Net effect: $z$ decreases

slope $= 1 - T'(z)$
Effect of Taxes/Transfers on Labor Supply

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

Disposable income

\[ z > z^* \]

\[ T(z) > 0: \text{income effect: } z \text{ increases} \]

\[ T'(z) > 0: \text{substitution effect: } z \text{ decreases} \]

Net effect on \( z \) is ambiguous

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

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

Pre-tax earnings \(z\)

45°

G

0

w*
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 $c = z - T(z)$
Introducing a small EITC is desirable for redistribution.

Participation response saves government revenue.

Win-Win reform.

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

Starting from a Means-Tested Program.
Introducing a small EITC is desirable for redistribution.
Participation response saves government revenue.
Win-Win reform: If intensive response is small.
Starting from a means-tested program

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

Pre-tax earnings \( z \)

\( 45^\circ \)

\( z^* \)

G
Reducing generosity of $G$ and phase-out rate is desirable if society puts low weight on zero earners. $= $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, Labor supply response saves government revenue. Win-Win reform.