Lecture 4: Optimal Labor Income Taxation

Stefanie Stantcheva

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Key question: Should government reduce inequality using taxes and transfers?

1) Governments use taxes to raise revenue

2) This revenue funds transfer programs:

a) Universal Transfers: Public Education, Health Care Benefits (only 65+ in the US), Retirement and Disability Benefits, Unemployment benefits

b) Means-tested Transfers: In-kind (Medicaid, public housing, foodstamps in the US) and cash benefits

Modern governments raise large fraction of GDP in taxes (30-45%) and spend significant fraction of GDP on transfers
FACTS ON US TAXES AND TRANSFERS

References: Comprehensive description in:

http://www.taxpolicycenter.org/taxfacts/

A) Taxes: (1) individual income tax (fed+state), (2) payroll taxes on earnings (fed, funds Social Security+Medicare), (3) corporate income tax (fed+state), (4) sales taxes (state)+excise taxes (state+fed), (5) property taxes (state)

B) Means-tested Transfers: (1) refundable tax credits (fed), (2) in-kind transfers (fed+state): Medicaid, public housing, nutrition (SNAP), education, (3) cash welfare: TANF for single parents (fed+state), SSI for old/disabled (fed)
FEDERAL US INCOME TAX

US income tax assessed on annual family income (not individual) [most other OECD countries have shifted to individual assessment]

Sum all cash income sources from family members (both from labor and capital income sources) = called Adjusted Gross Income (AGI) (adjustments = some deduction e.g., for business expenses, certain retirement contributions, etc.).

Main exclusions: fringe benefits (health insurance, pension contributions), imputed rent of homeowners, unrealized capital gains
FEDERAL US INCOME TAX

Taxable income = AGI - personal exemptions - deduction

personal exemptions = $4K * # family members (in 2016)

deduction is max of standard deduction or itemized deductions

Standard deduction is a fixed amount depending on family structure ($12.6K for couple, $6.3K for single in 2016)

Itemized deductions: (a) state and local taxes paid, (b) mortgage interest payments, (c) charitable giving, various small other items

[Itemized deductions, called tax expenditures \(\approx 10\%\) of AGI]
FEDERAL US INCOME TAX: TAX BRACKETS

Tax $T(z)$ is piecewise linear and continuous function of taxable income $z$ with constant marginal tax rates (MTR) $T'(z)$ by brackets.

In 2013–2016, 6 brackets with MTR 10%, 15%, 25%, 28%, 33%, 35%, 39.6% (top bracket for $z$ above $470K$), indexed on price inflation.

Lower preferential rates (up to a max of 20%) apply to dividends (since 2003) and realized capital gains [in part to offset double taxation of corporate profits].

Tax rates change frequently over time. Top MTRs have declined drastically since 1960s (as in many OECD countries).
$T(z)$ is continuous in $z$.

- Slope 39.6%
- Slope 15%
- Slope 10%

Individual Income Tax

T(z) is continuous in z
slope 39.6%
slope 15%
slope 10%

0 taxable income z
Marginal Income Tax

$T'(z)$ is a step function

$0 \quad \text{taxable income } z \quad 39.6\% \quad 15\% \quad 10\%$

$T'(z)$
Source: IRS, Statistics of Income Division, Historical Table 23
FEDERAL US INCOME TAX: TAX CREDITS

Tax credits: Additional reduction in taxes

(1) **Non refundable** (cannot reduce taxes below zero): foreign tax credit, child care expenses, education credits, energy credits, and many others

(2) **Refundable** (can reduce taxes below zero, i.e., be net transfers): EITC (earned income tax credit, up to $3.3K, $5.5K, $6.1K for working families with 1, 2, 3+ kids), Child Tax Credit ($1000 per kid, partly refundable)

Refundable tax credits are now the largest means-tested cash transfer for low income families
Figure 1: Earned Income Tax Credit by Number of Children and Filing Status, 2013

FEDERAL US INCOME TAX: TAX FILING

Taxes on year $t$ earnings are withheld on paychecks during year $t$ (pay-as-you-earn)

Income tax return filed in Feb-April 15, year $t + 1$ [filers use either software or tax preparers, huge private industry, most OECD countries provide pre-populated returns]

Most tax filers get a tax refund as withholdings larger than taxes owed in general

Payers (employers, banks, etc.) send income information to govt (3rd party reporting)

3rd party reporting + withholding at source is key for successful enforcement
MAIN MEANS-TESTED TRANSFER PROGRAMS

1) **Traditional transfers**: managed by welfare agencies, paid on monthly basis, high stigma and take-up costs $\Rightarrow$ low take-up rates (often only around 50%)

Main programs: Medicaid (health insurance for low incomes), SNAP (former food stamps), public housing, TANF (welfare), SSI (aged+disabled)

2) **Refundable income tax credits**: managed by tax administration, paid as an annual lumpsum in year $t + 1$, low stigma and take-up cost $\Rightarrow$ high take-up rates

Main programs: EITC and Child Tax Credit [large expansion since the 1990s] for low income working families with children
KEY CONCEPTS FOR TAXES/TRANSFERS

[Next slide:] budget \((z, z - T(z))\) which integrates taxes and transfers

1) Transfer benefit with zero earnings \(-T(0)\) [sometimes called demogrant or lumpsum grant]

2) Marginal tax rate (or phasing-out rate) \(T'(z)\): individual keeps \(1 - T'(z)\) for an additional $1 of earnings (intensive labor supply response)

3) Participation tax rate \(\tau_p = [T(z) - T(0)]/z\): individual keeps fraction \(1 - \tau_p\) of earnings when moving from zero earnings to earnings \(z\) (extensive labor supply response):

\[
z - T(z) = -T(0) + z \cdot (1 - \tau_p)
\]

4) Break-even earnings point \(z^*\): point at which \(T(z^*) = 0\)
\( c = z - T(z) \)

after-tax and transfer income

Budget Set

slope = 1 - \( T'(z) \)
\[ c = z - T(z) \]

\[ \tau_p = \text{participation tax rate} \]
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: Computations made by Emmanuel Saez using tax and transfer system parameters
Profile of Current Means-tested Transfers

Traditional means-tested programs reduce incentives to work for low income workers

Refundable tax credits have significantly increased incentive to work for low income workers

However, refundable tax credits cannot benefit those with zero earnings

Trade-off: US chooses to reward work more than most European countries (such as France) but therefore provides smaller benefits to those with no earnings
Utility $u(c)$ strictly increasing and concave

Same for everybody where $c$ is after tax income.

Income $z$ is fixed for each individual, $c = z - T(z)$ where $T(z)$ is tax/transfer on $z$ (tax if $T(z) > 0$, transfer if $T(z) < 0$)

$N$ individuals with fixed incomes $z_1 < \ldots < z_N$

Government maximizes **Utilitarian** objective:

$$SWF = \sum_{i=1}^{N} u(z_i - T(z_i))$$

subject to **budget constraint** $\sum_{i=1}^{N} T(z_i) = 0$ (taxes need to fund transfers)
Simpler Derivation with just 2 individuals

\[
\max SWF = u(z_1 - T(z_1)) + u(z_2 - T(z_2)) \text{ s.t. } T(z_1) + T(z_2) = 0
\]

Replace \( T(z_1) = -T(z_2) \) in \( SWF \) using budget constraint:

\[
SWF = u(z_1 + T(z_2)) + u(z_2 - T(z_2))
\]

First order condition (FOC) in \( T(z_2) \):

\[
0 = \frac{dSWF}{dT(z_2)} = u'(z_1 + T(z_2)) - u'(z_2 - T(z_2)) = 0 \Rightarrow
\]

\[
u'(z_1 + T(z_2)) = u'(z_2 - T(z_2)) \Rightarrow u'(z_1 - T(z_1)) = u'(z_2 - T(z_2))
\]

\( \Rightarrow z_1 - T(z_1) = z_2 - T(z_2) \) constant across the 2 individuals

Perfect equalization of after-tax income = 100% tax rate and redistribution.

Utilitarianism with decreasing marginal utility leads to perfect egalitarianism
[Edgeworth, 1897]
Derivation with N individuals

Replace $T(z_1) = -\sum_{i=2}^{N} T(z_i)$ from budget constraint:

$$SWF = u \left( z_1 + \sum_{i=2}^{N} T(z_i) \right) + \sum_{i=2}^{N} u(z_i - T(z_i))$$

First order condition (FOC) in $T(z_j)$ for a given $j = 2, \ldots, N$:

$$0 = \frac{\partial SWF}{\partial T(z_j)} = u' \left( z_1 + \sum_{i=2}^{N} T(z_i) \right) - u'(z_j - T(z_j)) = 0 \Rightarrow$$

$$u'(z_j - T(z_j)) = u'(z_1 - T(z_1)) \Rightarrow z_j - T(z_j) = \text{constant across } j = 1, \ldots, N$$

Perfect equalization of after-tax income = 100% tax rate and redistribution.
Utilitarianism and Redistribution

utility

consumption $c_1 \quad c_1 + c_2 \quad c_2$

$u(c_1) + u(c_2)$

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

$u(c_1) + u(c_2)$

$\frac{c_1 + c_2}{2}$

$2$
ISSUES WITH SIMPLE MODEL

1) **No behavioral responses:** Obvious missing piece: 100% redistribution would destroy incentives to work and thus the assumption that \( z \) is exogenous is unrealistic

⇒ Optimal income tax theory incorporates behavioral responses

2) **Issue with Utilitarianism:** Even absent behavioral responses, many people would object to 100% redistribution [perceived as confiscatory]

⇒ Citizens’ views on fairness impose **bounds** on redistribution govt can do [political economy / public choice theory]
EQUITY-EFFICIENCY TRADE-OFF

Taxes can be used to raise revenue for transfer programs which can reduce inequality in disposable income ⇒ Desirable if society feels that inequality is too large

Taxes (and transfers) reduce incentives to work ⇒ High tax rates create economic inefficiency if individual respond to taxes

Size of behavioral response limits the ability of government to redistribute with taxes/transfers

⇒ Generates an equity-efficiency trade-off

Empirical tax literature estimates the size of behavioral responses to taxation
Labor Supply Theory

Individual has utility over labor supply $l$ and consumption $c$: $u(c, l)$
increasing in $c$ and decreasing in $l$ [= increasing in leisure]

$$\max_{c, l} u(c, l) \quad \text{subject to} \quad c = w \cdot l + R$$

with $w = \bar{w} \cdot (1 - \tau)$ the net-of-tax wage ($\bar{w}$ is before tax wage rate and $\tau$ is tax rate), and $R$ non-labor income

FOC $w \frac{\partial u}{\partial c} + \frac{\partial u}{\partial l} = 0$ defines Marshallian labor supply $l = l(w, R)$

Uncompensated labor supply elasticity: $\varepsilon^u = \frac{w}{l} \cdot \frac{\partial l}{\partial w}$

Income effects: $\eta = w \frac{\partial l}{\partial R} \leq 0$
l = labor supply
R Slope=w
Marshallian Labor Supply 
l(w,R)
Indifference Curves
Labor Supply Theory 
Budget: c = wl+R 
c=z-T(z) 
consumption
Labor Supply Income Effect

Budget: $c = w l + R$

$c = z - T(z)$

consumption

labor supply $l$

Budget: $c = w l + R$
Labor Supply Income Effect

Budget: \( c = w_1 + R + dR \)

Budget: \( c = w_1 + R \)

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

consumption

\( l(w, R) \)

labor supply \( l \)
$$c = z - T(z)$$

Consumption

$$\eta = w \left( \frac{\partial l}{\partial R} \right) < 0$$

Labor Supply Income Effect
Labor Supply Theory

Substitution effects: Hicksian labor supply: $l^c(w, u)$ minimizes cost needed to reach $u$ given slope $w \Rightarrow$

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

Slutsky equation $\frac{\partial l}{\partial w} = \frac{\partial l^c}{\partial w} + l \frac{\partial l}{\partial R} \Rightarrow \varepsilon^u = \varepsilon^c + \eta$

Tax rate $\tau$ discourages work through substitution effects (work pays less at the margin)

Tax rate $\tau$ encourages work through income effects (taxes make you poorer and hence in more need of income)

Net effect ambiguous (captured by sign of $\varepsilon^u$)
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

0

labor supply $l$
Labor Supply Substitution Effect

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

consumption

utility \( u \)

Slope = \( w \)

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

Labor supply \( l \)
Labor Supply Substitution Effect

Slope = \( w \)

utility \( u \)

\[ \varepsilon_c = \frac{w}{l^c} \partial l^c / \partial w > 0 \]

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

consumption

\[ \frac{\partial}{\partial c} = z - T(z) \]
Uncompensated Labor Supply Effect

Budget: $c = w_l + R$

Consumption: $c = z - T(z)$
Uncompensated Labor Supply Effect

c = z - T(z)

consumption

\[ l(w, R) \]

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

\[ \varepsilon^u \]

\[ 0 \]

\[ l(w, R) \]

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

\[ \text{Labor supply } l \]
Uncompensated Labor Supply Effect

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

consumption

\[ \varepsilon^u > 0 \]

substitution effect

\[ \varepsilon^c > 0 \]

slope = w + dw

slope = w
Uncompensated Labor Supply Effect

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

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

$c = z - T(z)$ consumption

$R$
General nonlinear income tax

With no taxes: \( c = z \) (consumption = earnings)

With taxes \( c = z - T(z) \) (consumption = earnings - net taxes)

\( T(z) \geq 0 \) if individual pays taxes on net, \( T(z) \leq 0 \) if individual receives transfers on net

\( T'(z) > 0 \) reduces net wage rate and reduces labor supply through substitution effects

\( T(z) > 0 \) reduces disposable income and increases labor supply through income effects

\( T(z) < 0 \) increases disposable income and decreases labor supply through income effects

Transfer program such that \( T(z) < 0 \) and \( T'(z) > 0 \) always discourages labor supply
Effect of Taxes/Transfers on Labor Supply

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

Disposable income

\[ \text{slope} = 1 - T'(z) \]

\( z^* \)

Pre-tax earnings \( z \)

\[ -T(0) \]

45°
Effect of Taxes/Transfers on Labor Supply

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

Disposable income

\[ T(z) < 0: \]
Income effect:
\[ z \text{ decreases} \]

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

Net effect:
\[ z \text{ decreases} \]

Effect of Taxes/Transfers on Labor Supply
\( (z < z^*) \)

\[ \text{slope} = 1 - T'(z) \]
Effect of Taxes/Transfers on Labor Supply

\( z > z^* \)

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

disposable income

\[ -T(0) \]

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

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

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

Net effect on \( z \) is ambiguous

\( z^* \)

Effect of Taxes/Transfers on Labor Supply (\( z > z^* \))

c = z - T(z)
disposable income

\(-T(0)\)
slope = \(1 - T'(z)\)

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

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

Net effect on \( z \) is ambiguous

\( z^* \)

pre-tax earnings \( z \)
OPTIMAL LINEAR TAX RATE: LAFER CURVE

\[ c = (1 - \tau) \cdot z + R \] with \( \tau \) linear tax rate and \( R \) fixed universal transfer funded by taxes \( R = \tau \cdot Z \) with \( Z \) average earnings

Individual \( i = 1, \ldots, N \) chooses \( l_i \) to max \( u^i((1 - \tau) \cdot w_i l_i + R, l_i) \)

Labor supply choices \( l_i \) determine individual earnings \( z_i = w_i l_i \Rightarrow \) Average earnings \( Z = \frac{\sum_i z_i}{N} \) depends (positively) on net-of-tax rate \( 1 - \tau \).

Tax Revenue per person \( R(\tau) = \tau \cdot Z (1 - \tau) \) is inversely U-shaped with \( \tau \): \( R(\tau = 0) = 0 \) (no taxes) and \( R(\tau = 1) = 0 \) (nobody works): called the Laffer Curve.
Laffer Curve

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

\[ \tau^* = \frac{1}{1 + e} \quad \text{with} \quad e = \frac{1 - \tau}{Z} \cdot \frac{dZ}{d(1 - \tau)} \]
**OPTIMAL LINEAR TAX RATE: LAFFER CURVE**

Top of the Laffer Curve is at $\tau^*$ maximizing tax revenue:

$$0 = R'(\tau^*) = Z - \tau^* \frac{dZ}{d(1-\tau)} \Rightarrow \frac{\tau^*}{1-\tau^*} \cdot \frac{1-\tau^*}{Z} \frac{dZ}{d(1-\tau)} = 1$$

Revenue maximizing tax rate: $\tau^* = \frac{1}{1+e}$ with $e = \frac{1-\tau}{Z} \frac{dZ}{d(1-\tau)}$

* $e$ is the elasticity of average income $Z$ with respect to the net-of-tax rate $1-\tau$ [empirically estimable]

Inefficient to have $\tau > \tau^*$ because decreasing $\tau$ would make taxpayers better off (they pay less taxes) and would increase tax revenue for the government [and hence univ. transfer $R$]

If government is **Rawlsian** (maximizes welfare of the worst-off person with no earnings) then $\tau^* = 1/(1+e)$ is optimal to make transfer $R(\tau)$ as large as possible
Government chooses $\tau$ to maximize utilitarian social welfare

$$SWF = \sum_i u^i((1 - \tau)w_i l_i + \tau \cdot Z(1 - \tau), l_i)$$

taking into account that labor supply $l_i$ responds to taxation and hence that this affects the tax revenue per person $\tau \cdot Z(1 - \tau)$ that is redistributed back as transfer to everybody.

Government first order condition: (using the envelope theorem as $l_i$ maximizes $u^i$):

$$0 = \frac{dSWF}{d\tau} = \sum_i \frac{\partial u^i}{\partial c} \cdot \left[-z_i + Z - \tau \frac{dZ}{d(1 - \tau)}\right]$$
Hence, we have the following optimal linear income tax formula

\[ \tau = \frac{1 - \bar{g}}{1 - \bar{g} + e} \quad \text{with} \quad \bar{g} = \frac{\sum_i z_i \cdot \frac{\partial u_i}{\partial c}}{Z \cdot \sum_i \frac{\partial u_i}{\partial c}} \]

\(0 \leq \bar{g} < 1\) as \(\frac{\partial u_i}{\partial c}\) is decreasing with \(z_i\) (marginal utility falls with consumption)

\(\tau\) decreases with elasticity \(e\) [efficiency] and with parameter \(\bar{g}\) [equity]

Formula captures the **equity-efficiency trade-off**

\(\bar{g}\) is low and \(\tau\) close to Laffer rate \(\tau^* = 1/(1 + e)\) when

(a) inequality is high

(b) marginal utility decreases fast with income
OPTIMAL TOP INCOME TAX RATE  
(Diamond and Saez JEP’11)

In practice, individual income tax is progressive with brackets with increasing marginal tax rates. What is the optimal top tax rate?

Consider constant MTR \( \tau \) above fixed \( z^* \). Goal is to derive optimal \( \tau \)

In the US in 2016, \( \tau = 39.6\% \) and \( z^* \approx $500,000 \) (\( \approx \) top 1%).

Denote by \( z \) average income of top bracket earners [depends on net-of-tax rate \( 1 - \tau \)], with elasticity \( e = \left[ \frac{(1 - \tau)}{z} \right] \cdot \frac{dz}{d(1 - \tau)} \)

Suppose the government wants to maximize tax revenue collected from top bracket taxpayers (marginal utility of consumption of top 1% earners is small)
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
Disposable Income: $c = z - T(z)$

Market Income: $z$

Optimal Top Income Tax Rate (Mirrlees '71 model)

Mechanical tax increase:

$$d\tau [z - z^*]$$

Behavioral Response tax loss:

$$\tau \, dz = -d\tau \frac{e^z \tau}{1-\tau}$$

Source: Diamond and Saez JEP'11
OPTIMAL TOP INCOME TAX RATE

Consider small $d\tau > 0$ reform above $z^*$.

1) **Mechanical increase** in tax revenue:

$$dM = [z - z^*]d\tau$$

2) **Behavioral response** reduces tax revenue:

$$dB = \tau dz = -\tau \frac{dz}{d(1 - \tau)} d\tau = -\frac{\tau}{1 - \tau} \cdot e \cdot z \cdot d\tau$$

$$dM + dB = d\tau \left\{ [z - z^*] - e \frac{\tau}{1 - \tau} z \right\}$$

Optimal $\tau$ such that $dM + dB = 0$

$$\Rightarrow \frac{\tau}{1 - \tau} = \frac{1}{e} \cdot \frac{z - z^*}{z} \Rightarrow \tau = \frac{1}{1 + a \cdot e} \quad \text{with} \quad a = \frac{z}{z - z^*}$$
OPTIMAL TOP INCOME TAX RATE

Optimal top tax rate: \( \tau = \frac{1}{1 + a \cdot e} \) with \( a = \frac{z}{z - z^*} \)

Optimal \( \tau \) decreases with \( e \) [efficiency]

Optimal \( \tau \) decrease with \( a \) [thinness of top tail]

Empirically \( a \simeq 1.5 \), easy to estimate using distributional data

Empirically \( e \) is harder to estimate [controversial]

Example: If \( e = .25 \) then \( \tau = 1/(1 + 1.5 \cdot 0.25) = 1/1.75 = 73\% \)
Behavioral response to income tax comes not only from reduced labor supply but from tax avoidance or tax evasion.

Tax avoidance: legal means to reduce tax liability (exploiting tax loopholes)

Tax evasion: illegal under-reporting of income

Labor supply vs. tax avoidance/evasion distinction matters because:

1) If people work less when tax rates increase, there is not much the government can do about it.

2) If people avoid/evade more when tax rates increase, then the govt can reduce tax avoidance/evasion opportunities [closing tax loopholes, broadening the tax base, increasing tax enforcement, etc.]
REAL VS. AVOIDANCE RESPONSES

Key policy question: Is it possible to eliminate avoidance responses using base broadening, etc.? or would new avoidance schemes keep popping up?

a) Some forms of tax avoidance are due to poorly designed tax codes (preferential treatment for some income forms or some deductions)

b) Some forms of tax avoidance/evasion can only be addressed with international cooperation (off-shore tax evasion in tax havens)

c) Some forms of tax avoidance/evasion are due to technological limitations of tax collection (impossible to tax informal cash businesses)
OPTIMAL PROFILE OF TRANSFERS

If individuals respond to taxes only through intensive margin (how much they work rather than whether they work), optimal transfer at bottom takes the form of a “Negative Income Tax”:

1) Lumpsum grant \(-T(0) > 0\) for those with no earnings

2) High marginal tax rates (MTRs) \(T'(z)\) at the bottom to phase-out the lumpsum grant quickly

Intuition: high MTRs at bottom are efficient because:

(a) they target transfers to the most needy

(b) earnings at the bottom are low to start with \(\Rightarrow\) intensive labor supply response does not generate large output losses

But US system with zero MTR at bottom justified if society sees people with zero income as less deserving than average
Disposable income \( c = z - T(z) \)

Pre-tax earnings \( z \)

Starting from a means-tested program

\[ G \]

\[ 45^\circ \]

\[ z^* \]
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.
Starting from a means-tested program
Reducing generosity of $G$ and phase-out rate
is desirable if society puts low weight on zero earners

Labor supply response saves government revenue
Win-Win reform
Optimal Transfers: Participation Responses

Empirical literature shows that participation labor supply responses [whether to work or not] are large at the bottom [much larger and clearer than intensive responses]

Participation depends on participation tax rate:

\[ \tau_p = \frac{T(z) - T(0)}{z} \]

Individual keeps fraction \(1 - \tau_p\) of earnings when moving from zero earnings to earnings \(z\): 

\[ z - T(z) = -T(0) + z \cdot (1 - \tau_p) \]

Key result: in-work subsidies with \(T'(z) < 0\) are optimal when labor supply responses are concentrated along extensive margin and govt cares about low income workers.
The figure illustrates the relationship between pre-tax income and after-tax income. The equation for the after-tax income $c$ is given by:

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

The participation tax rate is denoted by $\tau_p$. The graph shows the pre-tax income $z$ on the horizontal axis and the after-tax income $c$ on the vertical axis. The line segment indicates the tax liability $T(z)$, and the difference $z - T(z)$ represents the after-tax income. The slope of the line is determined by $(1 - \tau_p)$, reflecting the effective marginal tax rate. The angle of 45 degrees is due to the assumption of a progressive tax system with a constant marginal tax rate $\tau_p$.
Starting from a Means-Tested Program

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

Pre-tax earnings \( z \)

\( 45^\circ \)

\( G \)

\( w^* \)
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

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

Pre-tax earnings \( z \)

\[ 45^\circ \]
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 $z$

0

$z^*$

45°
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: $c = z - T(z)$

Graph:

- 45° line
- Starting point $G$
- Pre-tax earnings $z$
- Income $z^*$
OPTIMAL PROFILE OF TRANSFERS: SUMMARY

1) If society views zero earners as less deserving than average [conservative view that substantial fraction of zero earners are “free loaders”] then low lumpsum grant combined with low phasing out rate at bottom is optimal.

2) If society views low income workers as more deserving than average [typically bipartisan view] and labor supply responses concentrated along extensive margin (work vs. not) then low phasing out rate at bottom is optimal.

3) Generous lumpsum grant with high MTR at bottom justified only if society views non workers as deserving and no strong response along the extensive margin (work vs. not).
ACTUAL TAX/TRANSFER SYSTEMS

1) Means-tested transfer programs used to be of the traditional form with high phasing-out rates (sometimes above 100%) ⇒ No incentives to work (even with modest elasticities)

Initially designed for groups not expected to work [widows in the US] but later attracting groups who could potentially work [single mothers]

2) In-work benefits have been introduced and expanded in OECD countries since 1980s (US EITC, UK Family Credit, etc.) and have been politically successful ⇒ (a) Redistribute to low income workers, (b) improve incentives to work
Debate on Basic Income vs. Means-tested transfer

Basic income definition: all people receive an unconditional sum of money (every year) regardless of how much they earn

This is the $R$ of the linear tax system $c = (1 - \tau) \cdot z + R$

Or the $-T(0) > 0$ of the nonlinear tax system $c = z - T(z)$

Basic income for everybody + higher taxes to fund it is economically equivalent to means-tested transfer phased out with earnings

Pro basic income: less stigmatizing than means-tested transfer

Cons: basic income requires higher “nominal” taxes (that are then rebated back)

Countries provide “in-kind” basic income in the form of universal health care (not the US) and public education
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

\[ z^* = \frac{R}{\tau} \]
IN-KIND REDISTRIBUTION

Most means-tested transfers are in-kind and often rationed (health care, child care, public education, public housing, nutrition subsidies) [care not cash San Francisco reform]

1) Rational Individual perspective:

(a) If in-kind transfer is tradeable at market price $\Rightarrow$ in-kind equivalent to cash

(b) If in-kind transfer non-tradeable $\Rightarrow$ in-kind inferior to cash

Cash transfer preferable to in-kind transfer from individual perspective
IN-KIND REDISTRIBUTION

2) **Social perspective:** 4 justifications:

a) Commodity Egalitarianism: some goods (education, health, shelter, food) seen as *rights* and ought to be provided to all

b) Paternalism: society imposes its preferences on recipients [recipients prefer cash]

c) Behavioral: Recipients do not make choices in their best interests (self-control, myopia) [recipients understand that in-kind is better for them]

d) Efficiency: It could be efficient to give in-kind benefits if it can prevent those who don’t really need them from getting them (i.e., force people to queue to get free soup kitchen)
FAMILY TAXATION: MARRIAGE AND CHILDREN

Two important issues in policy debate:

1) Marriage: What is the optimal taxation of couples vs. singles?

2) Children: What should be the net transfer (transfer or tax reduction) for family with children (as a function of family income and structure)?
TAXATION OF COUPLES

Three potentially desirable properties:

(1) income tax should be based on resources (i.e., family income if families fully share their income)

(2) income tax should be marriage neutral: no higher/lower tax when two single individuals marry

(3) income tax should be progressive (i.e., higher incomes pay a larger fraction of their income in taxes)

It is impossible to have a tax system that satisfies all 3 conditions simultaneously:

Income tax that is based on family income and marriage neutral has to satisfy: $T(z^h + z^w) = T(z^h) + T(z^w)$ and hence be linear i.e. $T(z) = \tau \cdot z$
TAXATION OF COUPLES

(1) If couples share their incomes, then family taxation is better. If couples don’t share their incomes, then individualized tax is better.

(2) If marriage responds to tax/transfer differential ⇒ better to reduce marriage penalty, i.e., move toward individualized system.

Particularly important when cohabitation is close substitute for marriage (as in Scandinavian countries).

(3) If labor supply of secondary earners more elastic than labor supply of primary earner ⇒ Secondary earnings should be taxed less (Boskin-Sheshinski JpubE’83).

Labor supply elasticity differential between primary and secondary earners is decreasing over time as earnings gender gap decreases (Blau and Kahn 2007).
TRANSFERS OR TAX CREDITS FOR CHILDREN

1) Children reduce **normalized family income** ⇒ Children increase marginal utility of consumption ⇒ Transfer for children $T_{kid}$ should be positive

In practice, transfers for children are always positive

2) Should $T_{kid}(z)$ increase with income $z$?

Pro: rich spend more on their kids than lower income families

Cons: Lower income families need child transfers most

In practice, $T_{kid}(z)$ is fairly constant with $z$

Europe has much more generous pre-kindergarten child care benefits, US has more generous cash tax credits for families with children
REFERENCES


