Optimal Labor Income Taxation

3080 Economic Policy Analysis II
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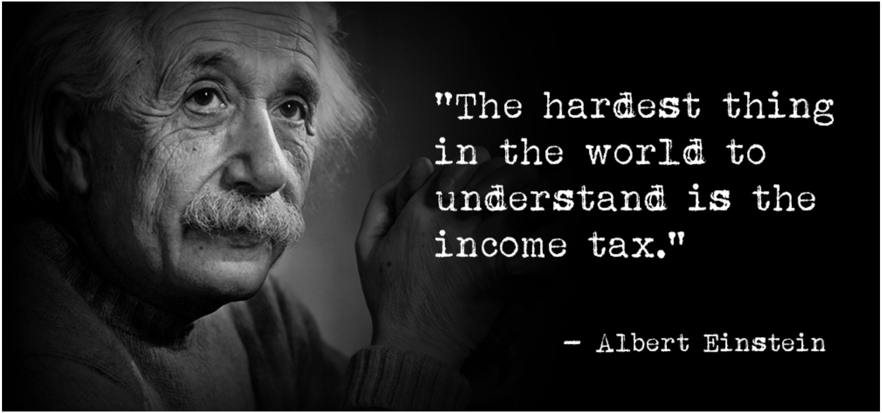
University of Nottingham


"The hardest thing in the world to understand is the income tax."
- Albert Einstein

GOALS OF LECTURES 2–3

To prove Einstein wrong!

1) Understand the core **optimal income tax model**: linear and nonlinear taxes in the Saez (2001) framework

- Understand the equity-efficiency trade-off
- Revenue-maximizing tax rate (Laffer curve)
- Optimal linear tax rate formula
- Optimal top tax rate

2) Study the **optimal design of transfer** programs

- With only intensive margin responses
- Introduce extensive margin responses
- Tagging and in-kind programs

TAXATION AND REDISTRIBUTION

Key question: By how much should government reduce inequality using taxes and transfers?

1) Governments use **taxes** to raise revenue and fund **transfer** programs which can reduce **inequality** in disposable income

2) Taxes (and transfers) create economic **inefficiency** if individuals are very responsive (work less, avoid/evade taxes)

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

Let's study the standard optimal model to see why...

KEY CONCEPTS FOR TAXES/TRANSFERS

Draw budget $(z, z - T(z))$ which integrates taxes and transfers

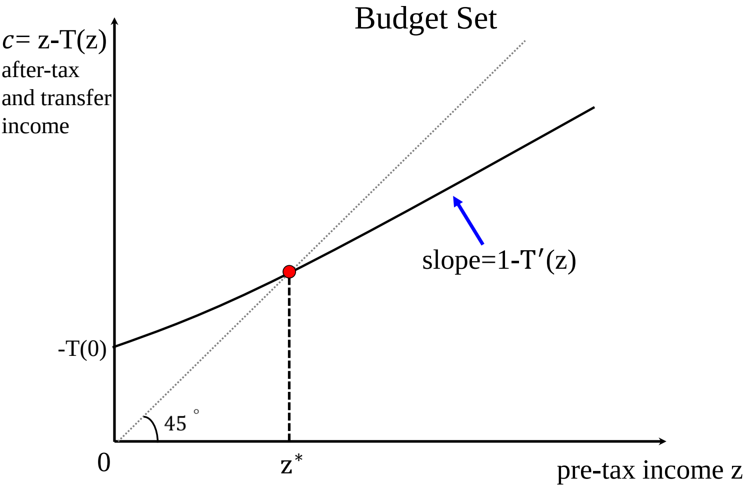
1) Transfer benefit with zero earnings $-T(0)$ [sometimes called demogrant or lumpsum grant]

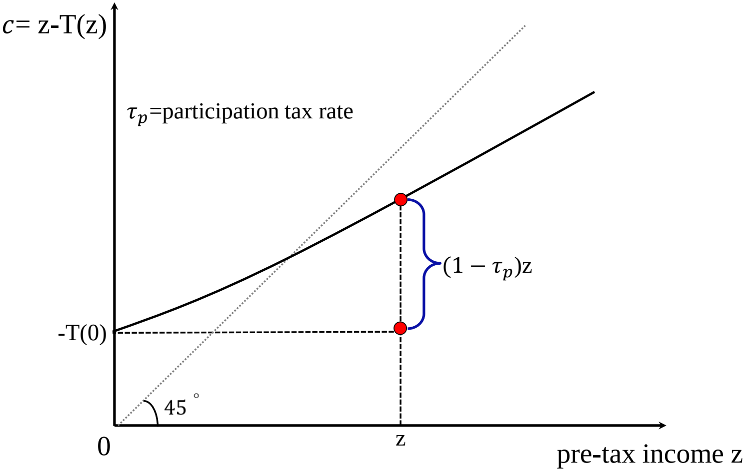
2) Marginal tax rate (or phasing-out rate) $T'(z)$: individual keeps $1 - T'(z)$ for an additional \$1 of earnings (matters for intensive labor supply response)

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

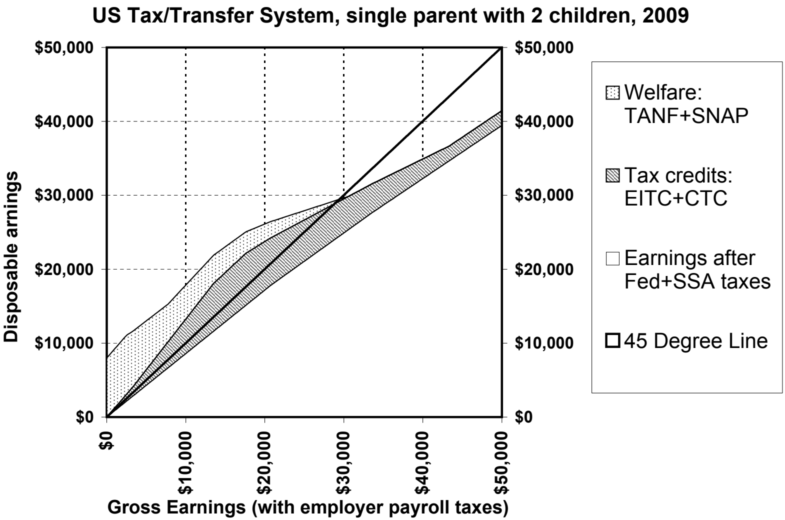
$$z - T(z) = -T(0) + z - [T(z) - T(0)] = -T(0) + z \cdot (1 - \tau_p)$$

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

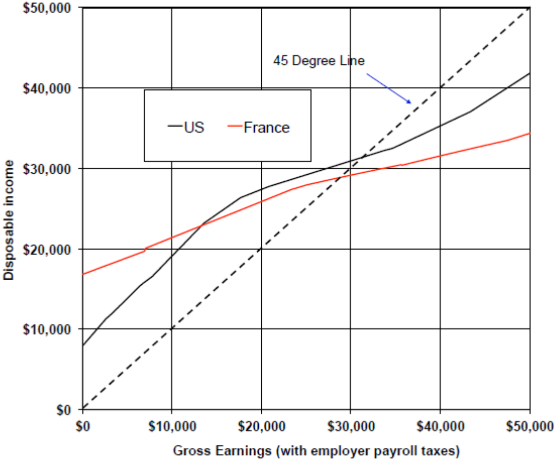

Budget Set
c= z-T(z)
after-tax
and transfer
income
-T(0)
45 °
0
z*
pre-tax income z
slope=1-T′(z)



c= z-T(z)
τ_p=participation tax rate
$(1-\tau_p)$z
-T(0)
45 °
0
z
pre-tax income z



Source: Computations made by Emmanuel Saez using tax and transfer system parameters



Source: Piketty, Thomas, and Emmanuel Saez (2012)

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 or the UK) but therefore provides smaller benefits to those with no earnings

OPTIMAL INCOME TAXATION

Goals

Optimal Taxation: Case with No Behavioral Responses

- Utility $u(c)$ strictly increasing and concave on after-tax income c. Same $u(c)$ for everybody

- 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 $z_1 < ... < z_N$

- 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)

Simple Model With No Behavioral Responses (skip)

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 $j = 2, .., N$:

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

$u'(z_j - T(z_j)) = u'(z_1 - T(z_1)) \Rightarrow z_j - T(z_j) =$ constant for $j = 1, .., N$

Perfect equalization of after-tax income = 100% MTR and redistrib

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

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:

$$SWF = u\left(z_1 + T(z_2)\right) + u(z_2 - T(z_2))$$

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

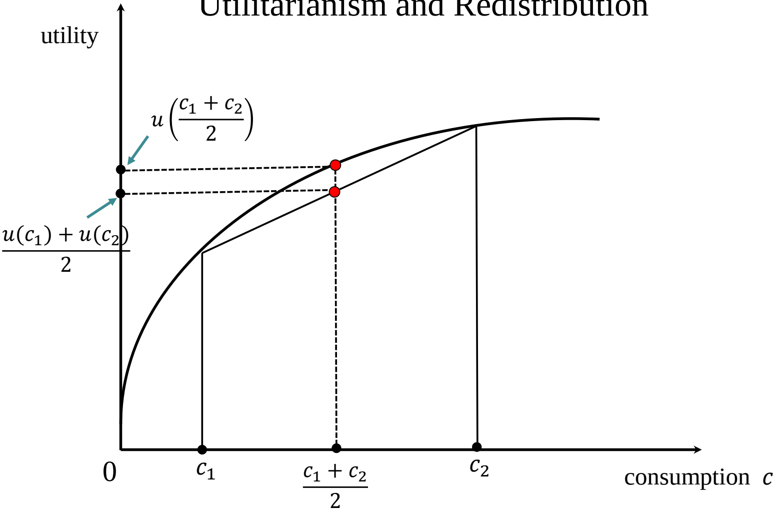
$$0 = \frac{dSWF}{dT(z_2)} = u'\left(z_1 + T(z_2)\right) - u'(z_2 - T(z_2)) = 0 \Rightarrow$$

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

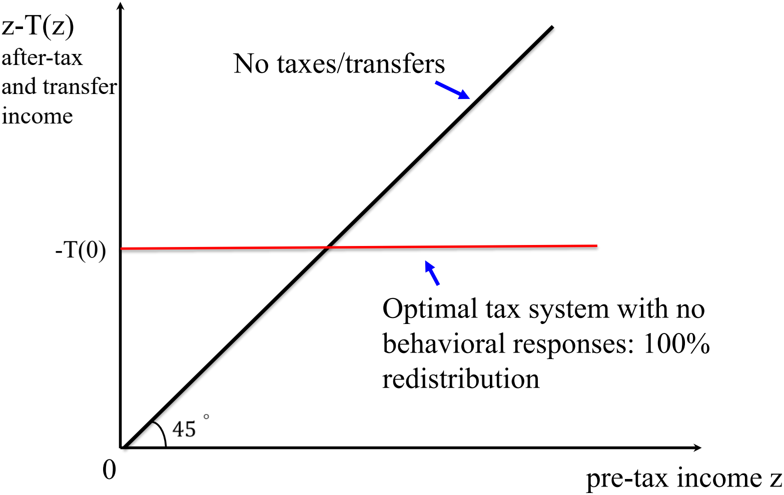
$\Rightarrow$ $z_1 - T(z_1) = z_2 - T(z_2)$ constant across the 2 individuals

Perfect equalization of after-tax income = 100% marginal tax rate and redistribution [see graph]

Utilitarianism and Redistribution



Optimal Tax/Transfer Systems



ISSUES WITH SIMPLE MODEL

1) **No behavioural 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 behavioural responses

2) **Issue with Utilitarianism:** Even absent behavioural 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

$\Rightarrow$ Desirable if society feels that inequality is too large

Taxes (and transfers) reduce **incentives** to work

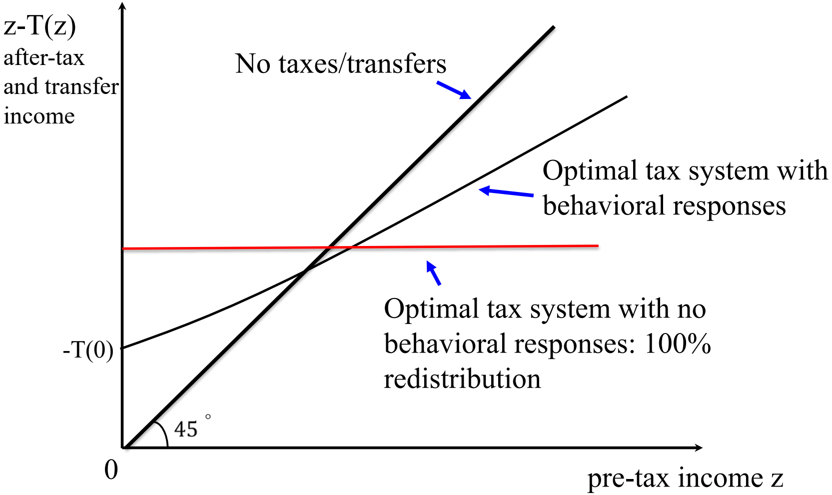
$\Rightarrow$ High tax rates create economic inefficiency if individuals respond to taxes

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

$\Rightarrow$ Generates an equity-efficiency trade-off

Empirical tax literature estimates the size of behavioral responses

Optimal Tax/Transfer Systems



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]

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

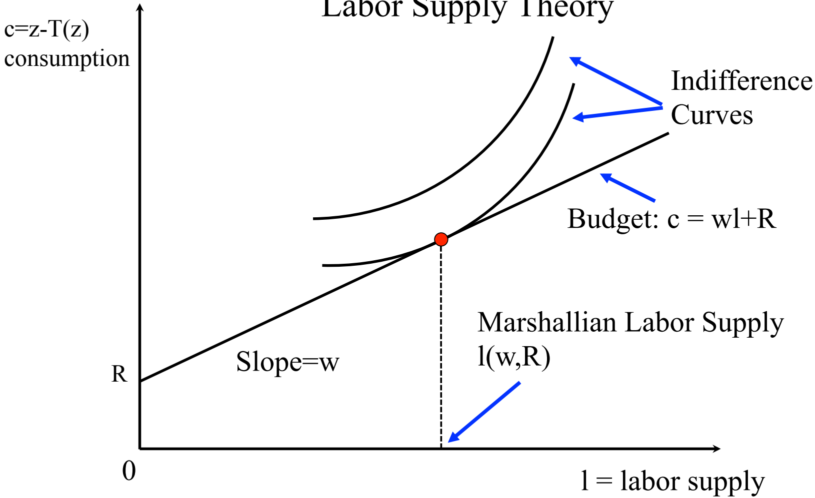
with $w = \bar{w} \cdot (1 - \tau)$ the net-of-tax wage ($\bar{w}$ is before tax wage rate and τ is tax rate), and R non-labor income

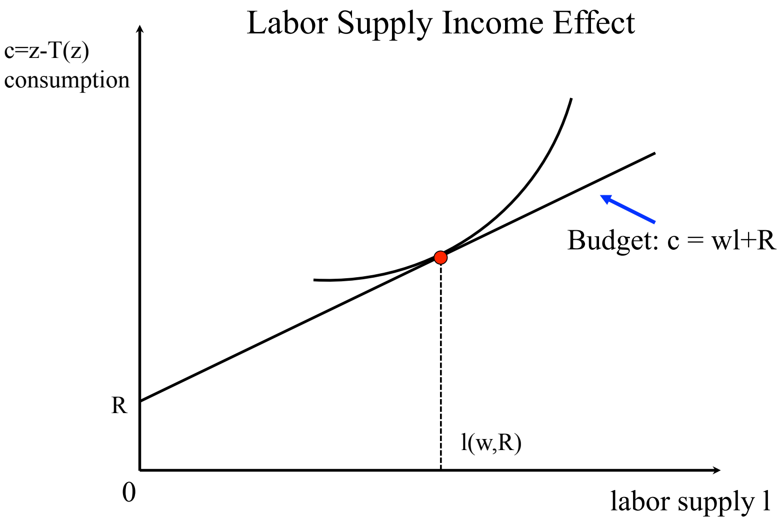
FOC $w\frac{\partial u}{\partial c} + \frac{\partial u}{\partial l} = 0$ defines Marshallian labor supply $l = l(w, R)$

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

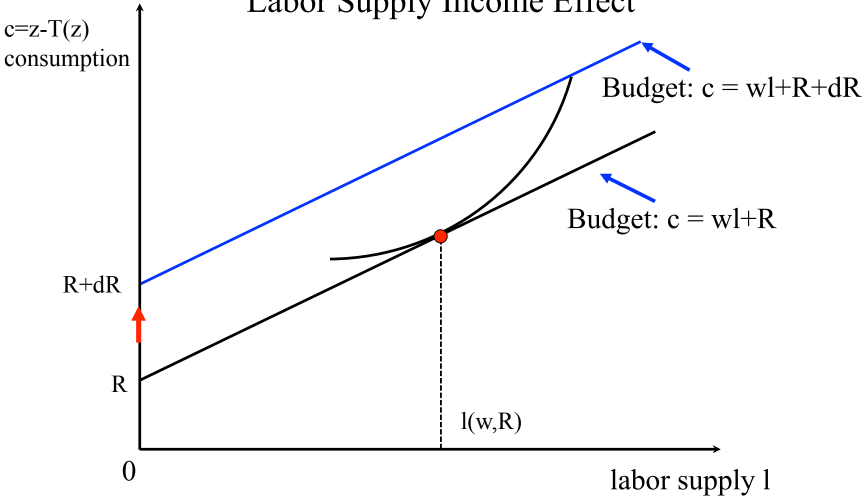
Income effects: $\eta = w\frac{\partial l}{\partial R} \leq 0$ (if leisure is a normal good)

Labor Supply Theory

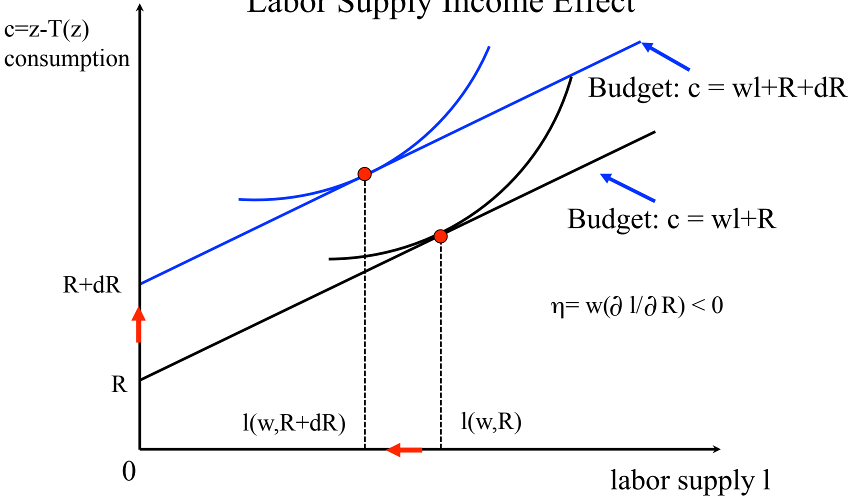



Labor Supply Income Effect
c=z-T(z)
consumption
Budget: c = wl+R
R
l(w,R)
0
labor supply l

Labor Supply Income Effect



Labor Supply Income Effect



Labor Supply Theory

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

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

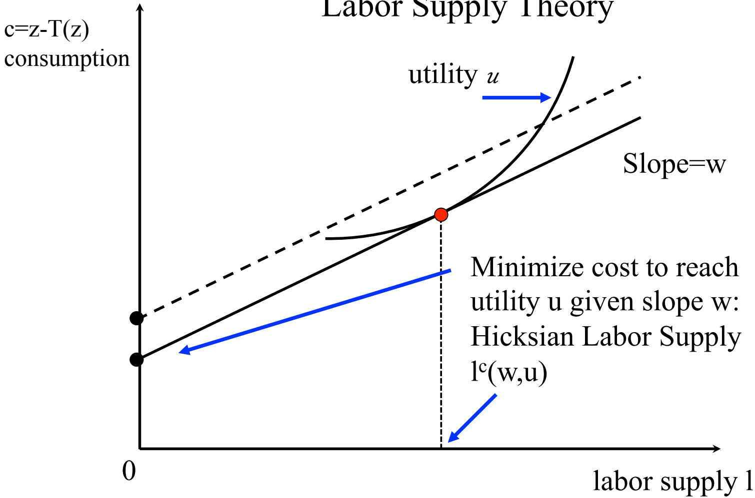
$$\textbf{Slutsky equation:} \quad \frac{\partial l}{\partial w} = \frac{\partial l^c}{\partial w} + l \frac{\partial l}{\partial R} \Rightarrow \varepsilon^u = \varepsilon^c + \eta$$

Marginal tax rate τ **discourages work** through **substitution effects** (work pays less at the margin)

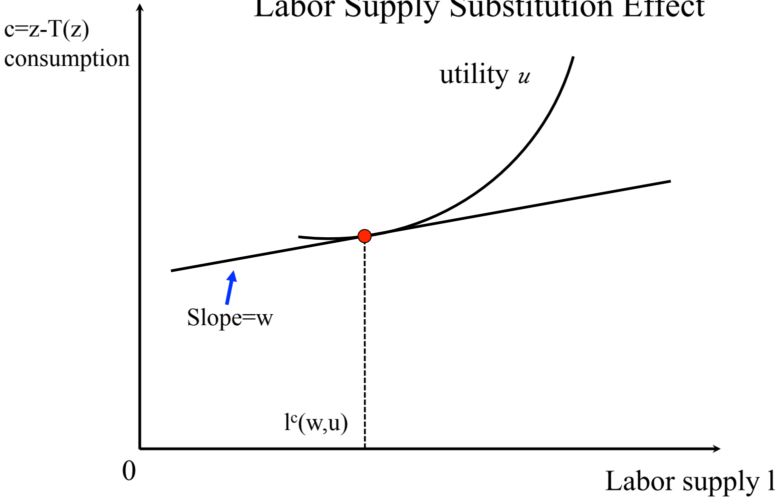
Marginal tax rate τ **encourages work** through **income effects** (taxes make you poorer and hence in more need of income)

Net effect ambiguous (captured by sign of ε^u)

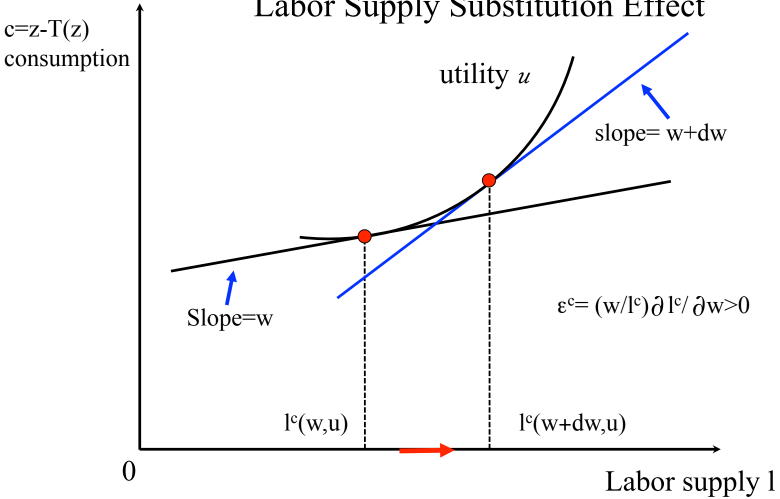
Labor Supply Theory



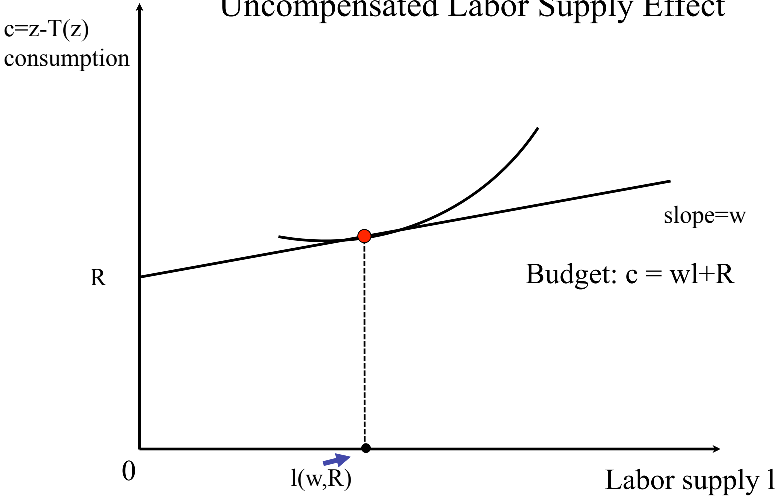
Labor Supply Substitution Effect



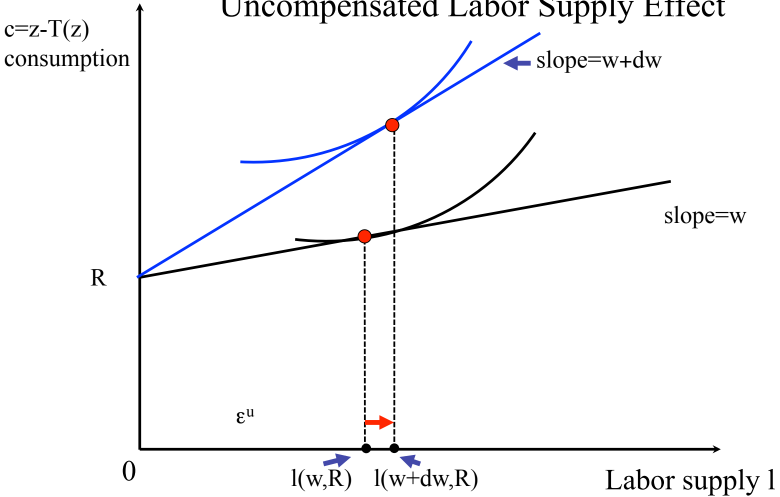
Labor Supply Substitution Effect



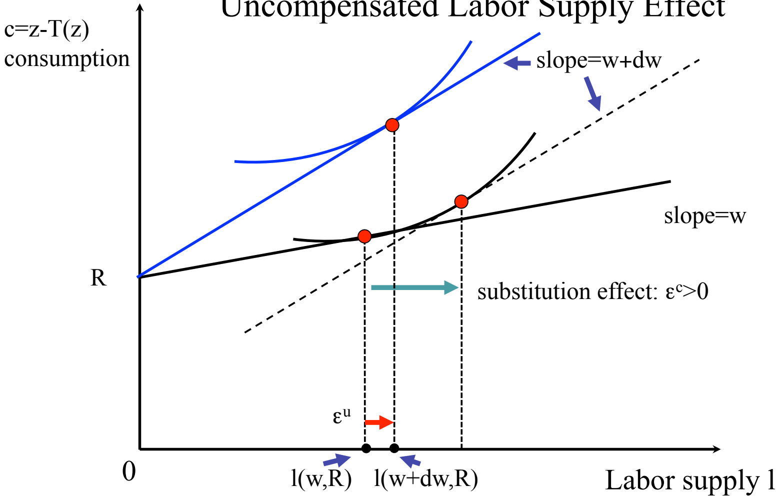
Uncompensated Labor Supply Effect



Uncompensated Labor Supply Effect



Uncompensated Labor Supply Effect



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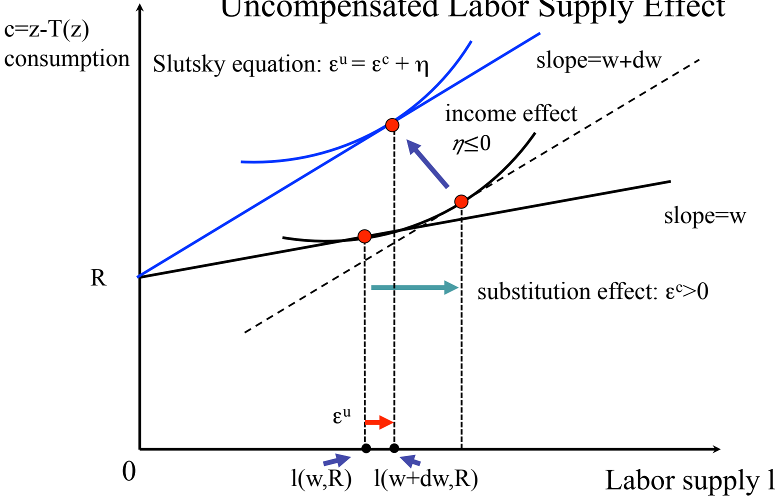


General nonlinear income tax

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

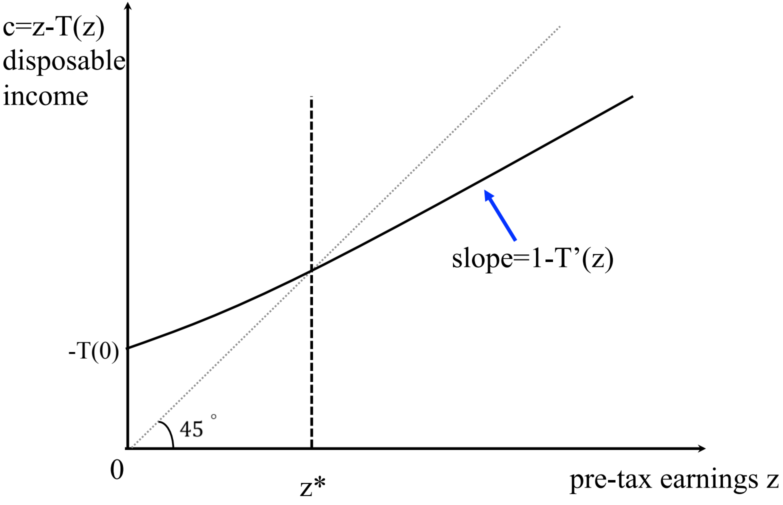
$T'(z) > 0$ reduces net wage rate and reduces labor supply through substitution effects

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

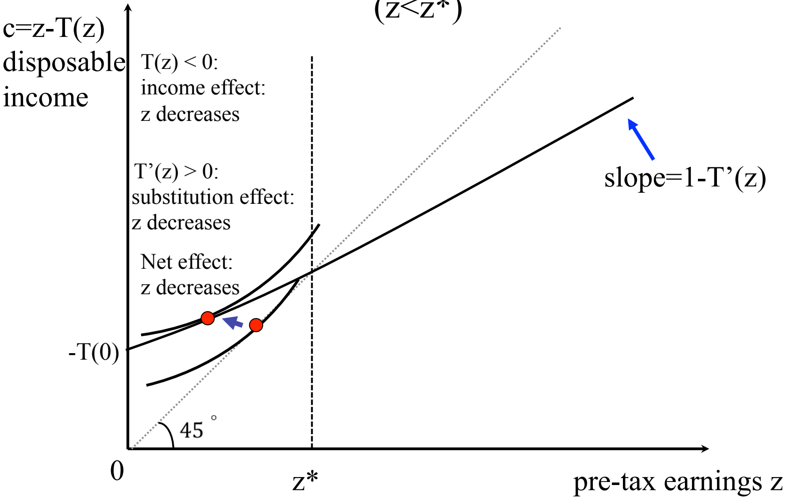
$T(z) < 0$ increases disposable income and decreases labor supply through income effects

Transfer program such that $T(z) < 0$ and $T'(z) > 0$ always discourages labor supply [see next graph when $z < z^*$]

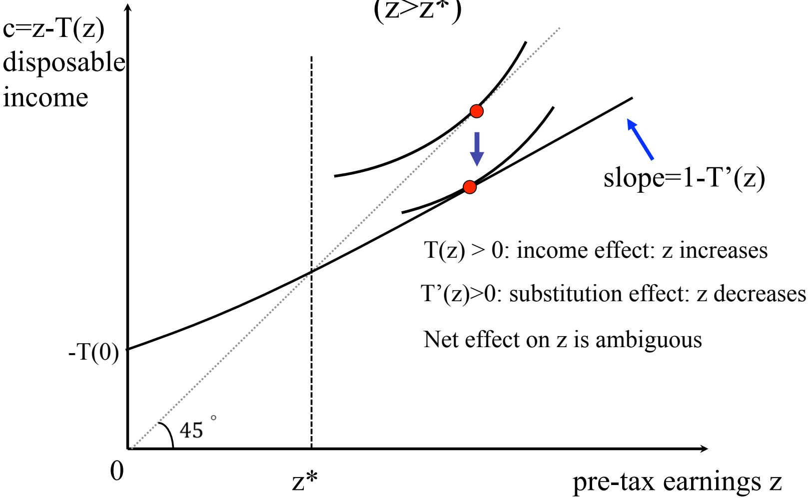
Effect of Taxes/Transfers on Labor Supply



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



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



OPTIMAL LINEAR TAX RATE: LAFFER CURVE

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

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

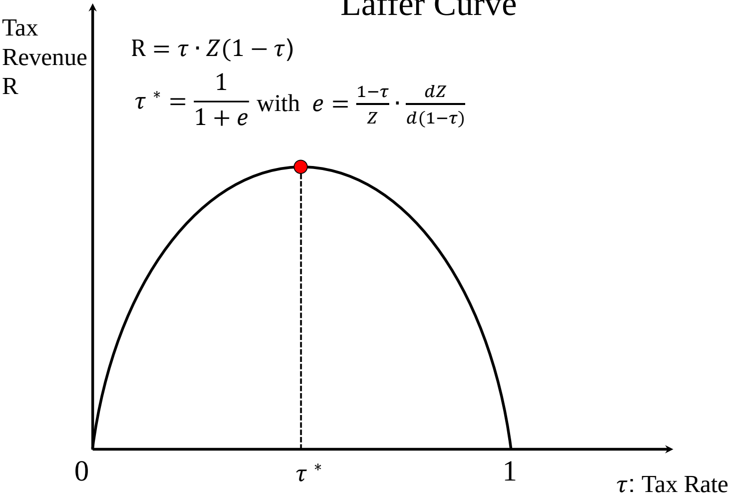
Labor supply choices l_i determine individual earnings $z_i = w_i l_i \Rightarrow$ Average earnings $Z = \sum_i z_i / N$ depends (positively) on net-of-tax rate $1 - \tau$.

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

Laffer Curve

$$R = \tau \cdot Z(1-\tau)$$

$$\tau^* = \frac{1}{1+e} \text{ with } e = \frac{1-\tau}{Z} \cdot \frac{dZ}{d(1-\tau)}$$



OPTIMAL LINEAR TAX RATE: LAFFER CURVE

Top of the Laffer Curve is at τ^* 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 τ 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** (i.e., 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

OPTIMAL LINEAR TAX RATE: FORMULA

Government chooses τ 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):

$$0 = \frac{dSWF}{d\tau} = \sum_i \frac{\partial u^i}{\partial c} \cdot \left[-z_i + Z - \tau \frac{dZ}{d(1-\tau)} \right],$$

OPTIMAL LINEAR TAX RATE: FORMULA

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 $\frac{\partial u^i}{\partial c}$ lower when income z_i is high (marginal utility falls with consumption)

τ decreases with elasticity e [efficiency] and with $\bar{g}$ [equity]

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

$\bar{g}$ is low and τ 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?

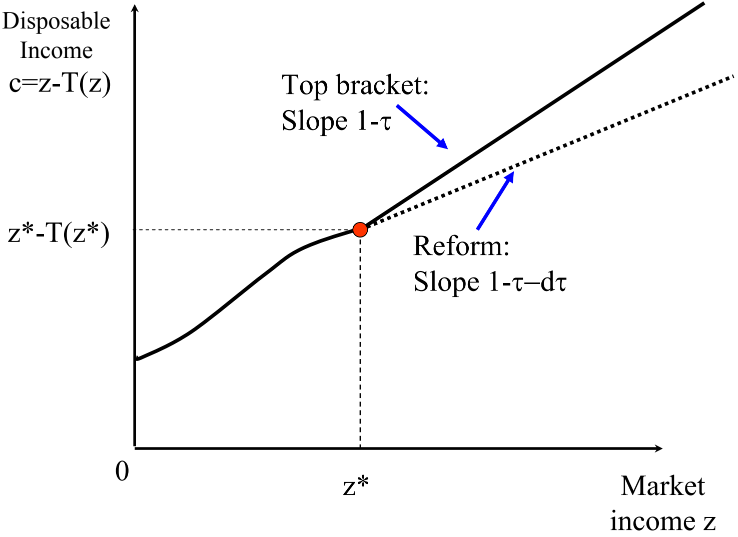
Consider constant MTR τ above fixed z^* Goal: derive optimal τ

In the UK, $\tau = 45\%$ and $z^* = £150,000$ ($\simeq$ top 1%)

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

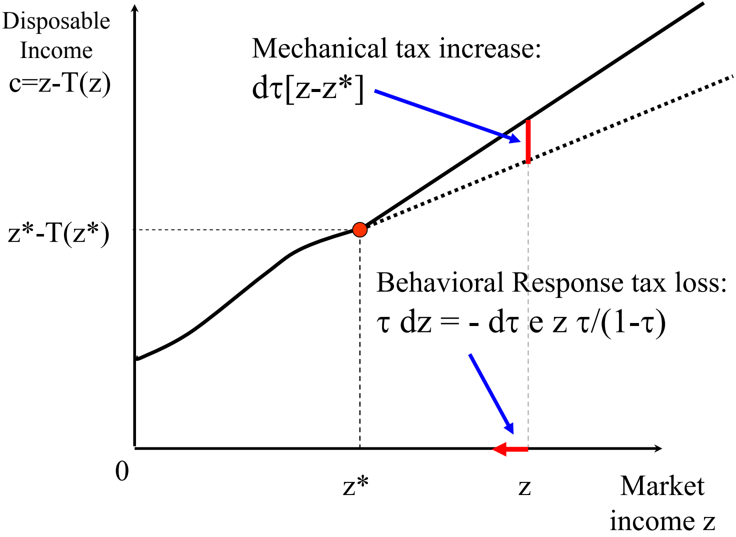
Suppose the government wants to maximize tax revenue collected from top bracket taxpayers (marginal utility of consumption of top 1% earners is small)

Optimal Top Income Tax Rate (Mirrlees '71 model)



Source: Diamond and Saez JEP'11

Optimal Top Income Tax Rate (Mirrlees '71 model)



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:

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

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

Optimal τ such that $dM + dB = 0$:

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

OPTIMAL TOP INCOME TAX RATE

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

Optimal τ decreases with e [efficiency]

Optimal τ decreases with a [thinness of top tail]

Empirically $a \in (1.5, 3)$. US has $a \simeq 1.5$, UK has $a \simeq 1.67$, Denmark has $a \simeq 3$. Easy to estimate using distributional data [in the US, mean income above $z^* =$ \$0.5m is about \$1.5m]

Empirically e is harder to estimate [controversial]

Example: If $e = 0.25$ then $\tau = 1/(1 + 1.5 \cdot 0.25) = 1/1.375 = 73\%$

REAL VS. TAX AVOIDANCE RESPONSES

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). E.g., untaxed fringe benefits.

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 [close tax loopholes, broaden the tax base, increase 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)

EXTENSIONS AND LIMITATIONS

1) Model includes only intensive earnings response. **Extensive earnings responses** [entrepreneurship decisions, migration decisions] $\Rightarrow$ Formulas can be modified

2) Model does not include **fiscal externalities**: part of the response to $d\tau$ comes from **income shifting** which affects other taxes $\Rightarrow$ Formulas can be modified

3) Model does not include **classical externalities**: (a) charitable contributions, (b) positive spillovers (trickle down) [top earners underpaid], (c) negative spillovers [top earners overpaid]

Classical general equilibrium effects on prices are NOT externalities and do not affect formulas [Diamond-Mirrlees AER '71, Saez JpubE '04]

OPTIMAL DESIGN OF TRANSFERS

▸ Goals

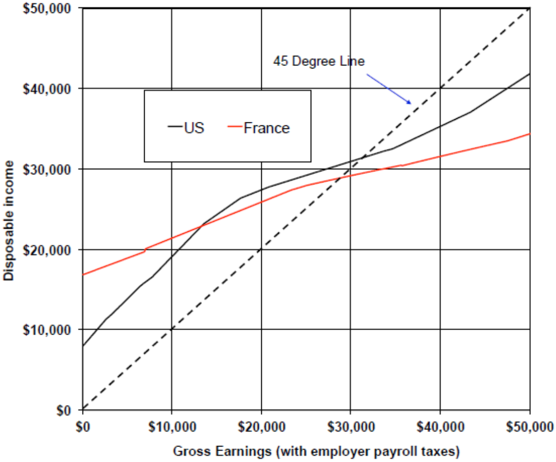
OPTIMAL DESIGN OF TRANSFERS

Transfers naturally integrated with taxes in optimal tax problem. What's the optimal way to redistribute to the less affluent?

Should govt provide **means-tested cash transfers**? And if so, how (e.g., NIT or in-work)?

Intensive vs extensive margin responses play a critical role in the **optimal profile of transfers (bottom rate formula)**

Can we do better than means-tested cash transfers? For example, **Tagging** or **In-kind** transfers



Source: Piketty, Thomas, and Emmanuel Saez (2012)

OPTIMAL TRANSFERS

(intensive responses)

If individuals respond to taxes only through **intensive margin** (how much they work rather than whether they work or not), 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 (MTR) $T'(z)$ at the bottom to phase-out the lumpsum grant quickly

OPTIMAL TRANSFERS

(intensive responses)

If individuals respond to taxes only through **intensive margin** (how much they work rather than whether they work or not), 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 (MTR) $T'(z)$ at the bottom to phase-out the lumpsum grant quickly

Intuition: high MTR 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

Caveat: if society sees non-workers as **less deserving** than average (free-loaders), then optimal phase-out rate is negative (subsidy) $\Rightarrow$ govt provides higher transfers for low-income earners rather than those out-of-work

OPTIMAL TRANSFERS

(intensive responses)

Simple graphical proof (discrete model; intensive margin responses)

Suppose that low ability individuals can choose to work and earn z_1 or not work and earn $z_0 = 0$

Govt offers transfer $c_0 = -T(0)$ to non-workers phased-out at rate τ_1 so that those working receive on net $c_1 = (1 - \tau_1)z_1 + c_0$

$h_0(1 - \tau_1)$ is the fraction not working (fn of the net-of-tax rate); $e_0 = -\frac{1-\tau_1}{h_0}\frac{dh_0}{d(1-\tau_1)}$ is the elasticity of the fraction non-working h_0 with respect to the bottom net-of-tax rate $1 - \tau_1$

Consider a small reform around the optimum: govt $\uparrow c_0$ by dc_0 and $\uparrow \tau_1$ by $d\tau_1$ leaving the tax schedule unchanged for those with $z \geq z_1$ so that $dc_0 = z_1 d\tau_1$. The reform has 3 effects:

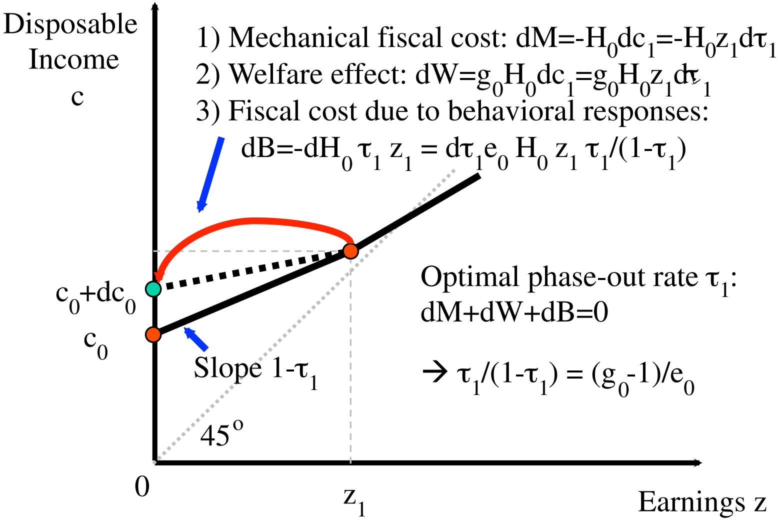
Reform: Increase τ_1 by $d\tau_1$ and c_0 by $dc_0=z_1 d\tau_1$

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:

$dB=-dH_0\,\tau_1\,z_1 = d\tau_1 e_0\,H_0\,z_1\,\tau_1/(1-\tau_1)$



Optimal phase-out rate τ_1:
$dM+dW+dB=0$

$\rightarrow \tau_1/(1-\tau_1) = (g_0-1)/e_0$

OPTIMAL TRANSFERS

(intensive responses)

The **fiscal cost** is $dM = -h_0 dc_0$ but the **welfare benefit** is $dW = h_0 g_0 dc_0$ where g_0 is the social welfare weight on non-workers

Labor supply of those above z_1 is not affected by the reform

By definition of e_0, a number $dh_0 = d\tau_1 e_0 h_0/(1 - \tau_1)$ of low-income workers stop working creating a revenue loss due to **behavioral responses** of $dB = -dh_0 z_1 \tau_1 = -d\tau_1 e_0 h_0 z_1 \tau_1/(1 - \tau_1)$

At the optimum, fiscal+welfare+behavioral effects sum zero ($dM + dW + dB = 0$) leading to the **optimal bottom rate formula**:
$\tau_1 = \frac{g_0 - 1}{(g_0 - 1 + e_0)}$

$\star$ Under standard redistributive preferences, g_0 is large (>1) implying that $\tau_1 > 0$ is large [E.g., with $g_0 = 3$ and $e_0 = 0.5$ then $\tau_1 = 80\%$]

$\star$ But $g_0 < 1$ with $\tau_1 < 0$ is conceivable if society considers non-workers as free-loaders $\Rightarrow$ EITC (or WTC) is optimal

OPTIMAL TRANSFERS

(participation responses)

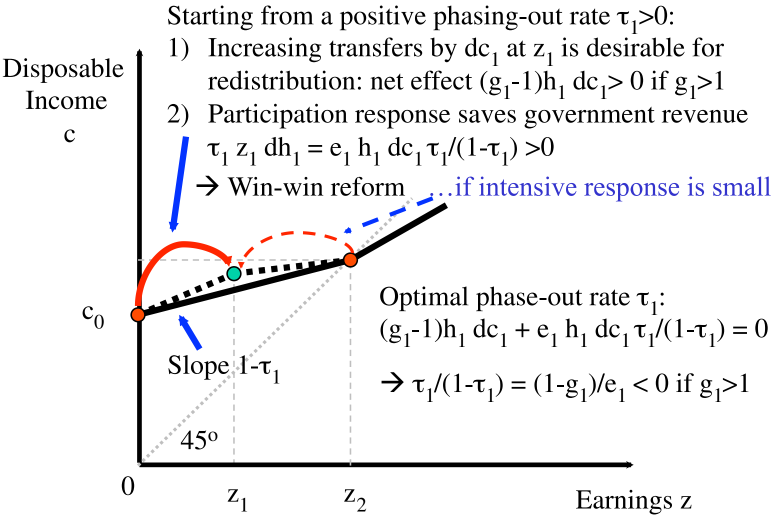
Empirical literature shows that participation labor supply responses [whether to work or not] are large at the bottom [much larger and clearer than intensive responses]

Key result: in-work subsidies (i.e., $T'(z) < 0$) are optimal when labor supply responses are concentrated along the extensive margin and govt cares about low-income workers [Saez QJE'02]

Simple graphical proof (discrete model; extensive margin responses)

Behavioral responses only take place through the extensive margin; earnings when working do not respond to MTRs

Govt starts from a transfer scheme with a positive phase-out rate $\tau_1 > 0$ and introduces an additional small in-work benefit dc_1 that increases net transfers to low-income workers earning z_1


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 $\tau_1 z_1 dh_1 = e_1 h_1 dc_1 \tau_1/(1-\tau_1) > 0$
→ Win-win reform
…if intensive response is small
Disposable Income c
c_0
Slope $1-\tau_1$
Optimal phase-out rate τ_1:
$(g_1-1)h_1\, dc_1 + e_1 h_1 dc_1 \tau_1/(1-\tau_1) = 0$
→ $\tau_1/(1-\tau_1) = (1-g_1)/e_1 < 0$ if $g_1>1$
45º
0
z_1
z_2
Earnings z

OPTIMAL TRANSFERS

(participation responses)

Let h_1 be the fraction of low-income workers with earnings z_1;
$e_1 = \frac{1-\tau_1}{h_1} \frac{dh_1}{d(1-\tau_1)}$ is the elasticity of h_1 with respect to the participation net-of-tax rate $1 - \tau_1$. The reform has again 3 effects:

1) A mechanical fiscal cost $dM = -h_1 dc_1$ for the government

2) A social welfare gain $dW = g_1 h_1 dc_1$ where g_1 is the marginal social welfare weight on low-income workers with earnings z_1
(Note: $dM + dW = (g_1 - 1) h_1 dc_1 > 0$ when $g_1 > 1$)

3) A tax revenue gain due to behavioral responses
$dB = \tau_1 z_1 dh_1 = e_1 [\tau_1 / (1 - \tau_1)] h_1 dc_1$. Intuition: reform induces some non-workers to start working to take advantage of the in-work benefit

Optimal bottom rate formula τ_1 is such that $dM + dW + dB = 0$:
$\tau_1 = \frac{1-g_1}{1-g_1+e_1}$ which implies that $\tau_1 < 0$ when $g_1 > 1$ (i.e., when £1 to low paid workers is more valued than £1 distributed to all)

Saez QJE'02: Intuition for EITC (or WTC)

Two types: doctors (wage w_h) and plumbers (wage w_l). Both can choose whether to work, but doctors cannot become plumbers

Transfer to 0-income individuals → help plumbers but distort doctors' incentives to work

Transfer to those with income of w_l → still help plumbers, but do not distort doctors' incentives

Therefore better to have a larger transfer to w_l than those with 0 income, i.e. have a subsidy for work = EITC

Pure extensive-margin model: transfer T_1 only distorts type-1 behavior
- Higher types don't move down
- But transfer T_0 distorts behavior of all types on extensive margin

OPTIMAL PROFILE OF TRANSFERS: SUMMARY

1) 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

2) 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)

3) If society views **non-workers** 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

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

INCREASING TARGETING EFFICIENCY

Can we do better than means-tested cash transfers?

1) Means-tested vs **Tagging** [Akerlof (1978)]

2) Cash vs **In-kind** programs [Nichols-Zeckhauser (1982)]
$\Rightarrow$ E.g., Gadenne et al (2021): In-kind transfers provide insurance against price risk (welfare improving for Indian households)

TAGGING: $T(z, X)$

If we can identify individual characteristics X that are

1) **Observable** to the government
2) **Negatively correlated with earnings capacity**
3) **Immutable** for the individual (unresponsive to incentives)

Then targeting benefits to such characteristics is **optimal**.

Criteria 1 makes this form of targeting feasible, criteria 2 ensures that it redistributes from high- to low-ability, and criteria 3 ensures no moral hazard associated with this redistribution.

Potential candidates: (i) disability, (ii) gender, (iii) race, (iv) height, (v) single motherhood [widely used as a tagging device, but accused by conservatives of destroying the traditional family]

IN-KIND REDISTRIBUTION

Most means-tested transfers are in-kind and often rationed (health care, childcare, public educ, public housing, nutrition subsidies)

1) **Rational Individual perspective:**

(a) If in-kind transfer is **tradeable** at market price ⇒ in-kind equivalent to cash

(b) If in-kind transfer **non-tradeable** ⇒ 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 in a just society

(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)

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Appendix ☺

Key slides:

⋆ **18:** How to draw budget constraints; $\neq$ predictions in models with and without behavioral responses

⋆ **32:** How substitution effects (SE) and income effects (IE) operate in labor supply model (but you know this from micro, right?)

⋆ **35-36:** The effect of taxes and transfers on labor supply ($z < z^*$ and $z > z^*$); how SE and IE move in opposite directions

⋆ **39:** Revenue-maximizing tax rate (Laffer curve)

⋆ **41-46:** Optimal linear tax rate formula (intuition); Optimal top income tax rate formula (intuition)

⋆ **54-58:** Optimal bottom rate formulas (under intensive and extensive responses)