Lecture 6: Optimal Transfers

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Spring 2019 – EC2450b
OPTIMAL TRANSFERS: MIRRLEES MODEL

Mirrlees model predicts that optimal transfer at bottom takes the form of a “Negative Income Tax”:

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

2) High 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 so intensive response does not generate large output losses

Diamond-Saez JEP’11: \(T'(0) = (g_0 - 1)/(g_0 - 1 + e_0)\) with \(e_0\) elasticity of the fraction non-working wrt to \(1 - T'(0)\) and \(g_0\) social marginal welfare weight on non-workers

\[\Rightarrow T'(0) \text{ large: e.g. } g_0 = 3 \text{ and } e_0 = .5 \Rightarrow T'(0) = 80\%\]
Reform: Increase $\tau_1$ by $d\tau_1$ and $c_0$ by $dc_0=z_1d\tau_1$

1) Mechanical fiscal cost: $dM=\mathcal{H}dc_0=\mathcal{H}z_1d\tau_1$

2) Welfare effect: $dW=g_0\mathcal{H}dc_0=g_0\mathcal{H}z_1d\tau_1$

3) Fiscal cost due to behavioral responses:

$$dB=-d\mathcal{H}\tau_1 z_1 = d\tau_1 e_0 \mathcal{H} \tau_1/(1-\tau_1) z_1$$

Optimal phase-out rate $\tau_1$:

$$dM+dW+dB=0 \Rightarrow \tau_1/(1-\tau_1) = (g_0-1)/e_0$$
Empirical literature shows that participation labor supply responses [due to fixed costs of working] are large at the bottom [much larger and clearer than intensive responses]

Diamond JpubE’80, Saez QJE’02, Laroque EMA’05 incorporate such extensive labor supply responses in the optimal income tax model

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 \( z \):

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

**Key result:** in-work subsidies with \( T'(z) < 0 \) (such as EITC) become optimal when labor supply responses are concentrated along extensive margin and social marginal welfare weight on low skilled workers \( > 1 \).
Model with discrete earnings outcomes: \( w_0 = 0 < w_1 < \ldots < w_I \)

Tax/transfer \( T_i \) when earning \( w_i \), \( c_i = w_i - T_i \)

Participation labor supply: Skill \( i \) individual compares \( c_i \) and \( c_0 \) when deciding to work \( \Rightarrow \) Participation tax rate \( \tau_i \) such that \( c_i - c_0 = w_i \cdot (1 - \tau_i) \)

Person works iff \( c_i - \theta \geq c_0 \) where \( \theta \) is fixed cost of working

\( \Rightarrow \) In aggregate, fraction \( h_i(c_i - c_0) \) of population earns \( w_i \)

Participation elasticity \( e_i = (c_i - c_0) / h_i \cdot \partial h_i / \partial (c_i - c_0) \)

Social Welfare function is summarized by social marginal welfare weights at each earnings level \( g_i \downarrow i \), and average to one \( \sum_i g_i h_i = 1 \) (if no income effects)
Starting from a Means-Tested Program

Consumption $c$

Earnings $w$

$G$

$45^\circ$

$w^*$

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

Starting from a Means-Tested Program

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

Source: revised version of Saez (2002), p. 1050
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 $\tau_1 z_1 dh_1 = e_1 \tau_1/(1-\tau_1) h_1 dc_1 > 0$
   \[ \Rightarrow \text{Win-win reform} \quad \text{...if intensive response is small} \]

Optimal phase-out rate $\tau_1$:
$(g_1 - 1)h_1 dc_1 + e_1 \tau_1/(1-\tau_1) h_1 dc_1 = 0$
   \[ \Rightarrow \tau_1/(1-\tau_1) = (1-g_1)/e_1 < 0 \text{ if } g_1 > 1 \]
Figure 3a: Optimal Tax/Transfer Derivation

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

**Welfare Effect:** $h_1 g_1 dc_1 > 0$

**Fiscal Effect:** $-h_1 dc_1 < 0$

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
Figure 3a: Optimal Tax/Transfer Derivation (assuming $g_1>1$)

Consumption $c$

Wage $w$

Net Welfare effect: $h_1dc_1(g_1-1)>0$

Labor Supply: $dh_1w_1\tau_1<0$

At the optimum:

$dh_1w_1\tau_1 + h_1dc_1(g_1-1)=0$

implies

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

Source: revised version of Saez (2002), p. 1052
Small reform $dc_i = -dT_i > 0$. Three effects:

1) Mechanical Change in tax revenue $dM = h_i dT_i$

2) Behavioral Effect: $dh_i = -e_i h_i dT_i / (c_i - c_0) \Rightarrow$ Tax loss: $dB = -(T_i - T_0) dh_i = -e_i h_i dT_i (T_i - T_0) / (c_i - c_0)$

3) Welfare Effect: each worker in job $i$ looses $dT_i$ so welfare loss $dW = -g_i h_i dT_i$ [No first order welfare loss for switchers]

FOC: $dM + dB + dW = 0 \Rightarrow$

$$\frac{\tau_i}{1 - \tau_i} = \frac{T_i - T_0}{c_i - c_0} = \frac{1}{e_i} (1 - g_i)$$

$g_1 > 1 \Rightarrow T_1 - T_0 < 0 \Rightarrow$ in-work subsidy
ACTUAL TAX/TRANSFER SYSTEMS

1) 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
TAGGING

We have assumed that $T(z)$ depends only on earnings $z$.

In reality, govt can observe many other characteristics $X$ also correlated with ability [gender, race, age, disability, family structure, height,...] and set $T(z, X)$. Two theory results:

1) If characteristic $X$ is immutable then redistribution across the $X$ groups will be complete [until average social marginal welfare weights are equated across $X$ groups]

2) If characteristic $X$ can be manipulated [behavioral response or cheating] but $X$ correlated with ability then taxes will still depend on both $X$ and $z$.

References: Akerlof AER’78 (welfare), Nichols-Zeckhauser AER’82 (welfare), Weinzierl ’11 (age), Mankiw-Weinzierl ’10 (height), Kaplow ’08 (chapter 7)
Consider \( X \) binary immutable (Talls vs. Shorts)

With \( T(z) \) independent of \( X \), Talls have higher ability on average \( \Rightarrow \)
Average social marginal welfare weights \( \bar{g}^T < \bar{g}^S \) \( \Rightarrow \) Transfer from Talls to Shorts is desirable (surtax on Talls which finances an allowance on Shorts)

Optimal height transfers should be up to point where \( \bar{g}^T = \bar{g}^S \)

Mankiw-Weinzierl '09 compute the optimal \( T^{Tall}(z) \) and \( T^{Short}(z) \) based on calibrated mode: optimal transfer \( T^{Tall}(z) - T^{Short}(z) \) not trivial (\( \sim 10\% \) of income)

They also show that you can get a (very modest) Pareto improvement using taxes on height and income instead of only income
PROBLEM WITH TAGGING

In practice public would oppose height based redistribution because height does not cause high earnings

1) **Horizontal Equity** concerns [people with same “ability-to-pay” should pay the same tax] impose constraints on feasible policies [not captured by utilitarian framework]

2) Constrained optimization analysis [$T(z)$ instead of $T(z, X)$] remains valid even with heterogeneity in preferences

3) In practice $T(z, X)$ depends on $X$ only when $X$ is **directly** related to welfare [family structure, # kids, medical expenses] or ability to earn [disability status] (“ability-to-pay” intuition)
IN-KIND REDISTRIBUTION

Majority of actual transfers are in-kind (health care, child care, education, public housing, nutrition subsidies)

1) Rational Individual perspective:
   (a) In-kind transfer is **tradeable** at market price ⇒ in-kind equivalent to cash
   (b) In-kind transfer **non-tradeable** ⇒ in-kind inferior to cash.
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) Under standard welfarist objective: Efficiency considerations in a 2nd best context
EFFICIENCY OF IN-KIND REDISTRIBUTION

Depends on what income tax tools are available:

1) No income tax: Income $z$ not observable (devo countries) $\Rightarrow$ In-kind provision or subsidies for necessities desirable

2) Linear tax model (Ramsey): Guesnerie–Roberts EMA'84 $\Rightarrow$ rationing goods encouraged by the tax system is desirable [and forcing consumption of goods discouraged by tax]

3) Nonlinear income tax: Under Atkinson–Stiglitz assumption [weak-separability and homogeneity $U^h(v(c_1, \ldots, c_K), z)$] $\Rightarrow$ Any distortion (quota, rationing, subsidy) involving $c$ choices not desirable provided $T(z)$ optimal

If good $c_k$ related to leisure/ability [soup kitchen with queuing requirement] then A–S fails and in-kind redistribution possibly desirable even with optimal $T(z)$
Many actual transfer programs impose requirements on beneficiaries (complex application, job search, training, or work requirements) and hence have low take-up (often $< 50\%$).

1) If social objective is welfarist and income $z$ observable: ordeals unlikely to be desirable:

Compare ordeal to benefit cut: (a) only benefit cut saves money mechanically, (b) both reduce welfare of recipients, (c) both reduce take-up [good fiscally]

Need implausible sorting effects for ordeal to be desirable [e.g., ordeal does not hurt much deserving beneficiaries and discourages undeserving take-up, conditional on $z$]

2) If $z$ is not observable then ordeal could be desirable (kitchen soup line)

3) With non-welfarist objective [such as poverty alleviation], ordeal can be desirable [Besley-Coate AER’92]
WORK RESTRICTIONS AND MINIMUM WAGE

Minimum wage creates rationing of low skilled work. Could minimum wage be desirable on top of nonlinear tax/transfer?

Lee and Saez JpubE’12 use a job choice model [Saez QJE ’02 with endogenous wages]. Two results:

1) Minimum wage desirable if (a) govt wants to redistribute to low skilled workers \((g_1 > 1)\) and (b) rationing created by min wage is efficient

2) If labor supply responses along extensive margin only then minimum wage with positive tax rate on low skilled work \(\tau_1 > 0\) is 2nd best Pareto inefficient

⇒ EITC and min wage are complementary
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 $dc_1$

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

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

dc₁ > 0 makes low skilled job w₁ more attractive → would reduce w₁ 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. 

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

Welfare Effect > 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

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

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

$h_1 d\bar{w} + h_2 dw_2 = 0$ (no profits)

and $\text{tax} = (\bar{w} - c_1) h_1 + (w_2 - c_2) h_2$

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

Consumption $c$

Wage $w$

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
$h_1d\bar{w}+h_2dw_2=0$ (no profits)
and tax=$=(\bar{w}-c_1)h_1+(w_2-c_2)h_2$

Source: Lee and Saez (2008)
FAMILY TAXATION: MARRIAGE AND CHILDREN

Two important issues in policy debate:

1) Marriage: What is the optimal taxation of couples vs. singles? Should secondary earnings be treated differently?

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

Theoretical literature is not great in part because utilitarian framework is not satisfactory
TAXATION OF COUPLES

1) Economies of scale and sharing in consumption within families ⇒ Welfare best measured by family income relative to size [≡ normalized income]

⇒ Taxes/Transfers should be based on normalized family income which can create a marriage penalty / subsidy

Note: Impossible to have a tax/transfer system that

(1) is family income based $T(z^h + z^w)$

(2) has marriage neutrality $T(z^h, z^w) = T(z^h) + T(z^w)$

(3) is progressive (i.e., not strictly linear)

Proof: (1)+(2) ⇒ $T(z^h + z^w) = T(z^h) + T(z^w)$ ⇒ $T(z) = \tau \cdot z$
TAXATION OF COUPLES

2) If marriage responds to tax/transfer differential ⇒ better to reduce marriage penalty and move toward individualized system

Particularly important cohabitation is close substitute to marriage (Scandinavian countries)

3) Labor supply of secondary earners more elastic than labor supply of primary earner ⇒ Secondary earnings should be taxed less (standard Ramsey intuition, Boskin-Sheshinski JpubE’83)

But labor supply elasticity differential is decreasing as earnings gender gap decreases [Blau and Kahn JOLE’07]

In OECD countries: income tax systems have become individual based but means tested transfers have remained family based
TRANSFERS OR TAX CREDITS FOR CHILDREN

1) Children reduce **normalized income** ⇒ 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:** they reduce normalized income most for upper earners [e.g., France computes taxes as $N \cdot T(z/N)$ where $N$ is # family members, kids count as .5 ⇒ $T_{kid}(z)$ increases with $z$].

**Cons:** lower earners need child transfers most [most OECD countries have means-tested transfers conditional on number of kids ⇒ $T_{kid}(z)$ decreases with $z$, US has $T_{kid}(z)$ inverted U-shape due to EITC and Child Tax Credit]
3) Family does not make decisions as a single unit (Chiappori JPE'92): transfers to mothers has bigger effects on children’s consumption than transfers to fathers [Lundberg et al. ’97, Duflo ’03]

4) Children create externalities [positive: pay-as-you-go retirement programs, negative: global warming]. If fertility responds to transfers, case for subsidizing/taxing children

5) Child care costs are positively related to work ⇒ Such costs should be subsidized by Atkinson-Stiglitz [often they are in practice]:

Public pre-kindergarten in Europe is a huge in-work subsidy for mothers ⇒ Large effect on mothers’ labor force participation (bigger effect than US EITC)
CHILDREN AND LIMITS OF UTILITARIAN MODEL

If fertility decisions unrelated to children tax/transfers ⇒ Social marginal utility should be equated across families with 0 children, families with 1 child, etc.

If ability uncorrelated with children ⇒ Families with kids will get fully compensating transfers

If ability positively correlated with children ⇒ Families with kids might be taxed more heavily [as in the height tax case]

Seems an absurd model to think about transfers for children ⇒ Need to come up with more realistic alternative
REFERENCES

