Equality of Opportunity

and School Financing Structure

Juan Rios

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Motivation (I)

1. Normative Principles:
   - **Compensation Principle:** "Allocation is intended to compensate individuals for their disadvantageous **circumstances**" (Roemer, 2012)
   - **Liberal Reward Principle:** "Particular Inequalities due to **responsibilities** should be left untouched" (Fleurbaey, 2008)

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2. Crucial distinction
   - Circumstances: Affect opportunity sets
   - Responsibility: Affect preferences

Motivation (II)

- "It is, of course, a deep philosophical question, with psychological and neurophysiological components, to determine exactly what constitutes the complete set of circumstances for any given social problem. In practice, we choose some circumstances for the purpose of the computation, and define the partition of types with respect to those. We then arbitrarily attribute the variation in the acquisition of the objective among those within a type entirely to differential effort." (Roemer, 2003)

Motivation (III)

- Equality of Opportunity: force to equalize school investment
- Transfers from Central Government
- Property Taxes are efficient to finance local public schools (Tiebout)

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- Property Taxes are efficient to finance local public schools (Tiebout)
- Efficiency vs Equality of Opportunity
- Property Taxes vs Central Transfers

The Research Question

- What is the optimal public school financing structure?
  - Equality of Opportunity vs Efficiency
  - Central Government Transfers vs Property Taxes

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- What is the optimal public school financing structure?
  - Equality of Opportunity vs Efficiency
  - Central Government Transfers vs Property Taxes
- Optimal Policy depends on
  - Elasticities of house prices wrt to scholl investments
  - House price distribution
  - Elasticity of children wages wrt public sch. inv.

Related Literature

1. **Equality of Opportunity:** Fleurbaey (2008), Roemer (2012), Saez and Stancheva (2016), Jacquet et al (2015), Lockwood and Weinzierl (2015), Bergstrom and Dodds (2016).

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   - EOp vs Efficiency of Local Taxes
   - Optimality as function of elasticities

Outline

1 Normative Criteria

Outline

1. Normative Criteria
2. Model

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3. Optimal Policy

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4. Future Directions

Equality of Opportunity Function

$$u(\alpha, \gamma, x)$$

- α: Circumstances
- γ: Responsibility
- x: Policy

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$$EOp(x) = \int \min_{\alpha} u(\alpha, \gamma, x) dF(\gamma)$$

Link to General EOp

Example

Table : Economy with 4 Types

Circumstances α	Responsibility γ Low	High	EOp $\int \min_{\alpha} u(\alpha,\gamma)dF(\gamma)$
Selfish Parents	0	4	-
Altruistic Parents	6	10	-
$\min_{\alpha} u(\alpha,\gamma)$	0	4	$4 * Prob(\gamma = High)$

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EOp reconciled with Welfarism

- If all heterogeneity is α: $EOp = \min u(\alpha, x)$
- If all heterogeneity is γ: $EOp = \int u(\gamma, x)dF(\gamma)$

Link to Optimal Tax Results

First Best

1. **EOp:** Planner observes parents altruism
   - $u(\alpha, \gamma) = u(\gamma), \forall \alpha$
   - No equality of outcome even in the first best

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2. **Mirrlees:** Planner observes ability
   - $u(\theta) = u \ \forall \theta$
   - Equality of outcome

Assumptions

1. 2 generations
2. Parents are heterogeneous only on altruism
3. Planner observes house prices
4. Uniform property tax rate across districts
5. Uniform house quality within district

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Tractability

1. Housing supply totally inelastic
2. Single crossing of parents' consumption and school investments with respect to their altruism parameter.

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What is in the model

Focus on trade off between the efficiency of property taxes and redistribution of central transfers.

Children's Problem

$$v^k(\alpha, \gamma, x) \equiv \max_{c,e} \; u^k(c, e; \gamma) \; s.t.$$
$$c \leq w^k\Big(e, \alpha, x\Big)$$

- $u^k(\cdot)$: Kids' utility
- α: Parents' Preferences
- γ: Responsibility
- x: School District investment
- c: Consumption
- e: Effort in education
- $w^k(\cdot)$: Endogenous children income

Parents' Problem

$$v^p(\alpha) \equiv \max_{h,l} \left\{ u^p\left(x_h, l; \alpha\right) \ s.t. \right.$$
$$\left. (1+t)P\left(x_h\right) \leq l \right\}$$

- $u^p(\cdot)$: Parents' utility
- h: District index
- t: Property tax rate
- $P(x_h)$: Price of a house in h with x_h
- l: Parents labor supply ($w^p \equiv 1$)
- $u_l^p(\alpha) \equiv 1 \ \forall \alpha$

No need to redistribute across parents:

$$\Rightarrow u_x^p(\alpha) = (1+t)P'\left(x_h(\alpha)\right)$$

Parents' Problem: Reduced Form

$$\tilde{u}\Big(x, P; \alpha\Big) = u^p\Big(x, (1+t)P; \alpha\Big)$$

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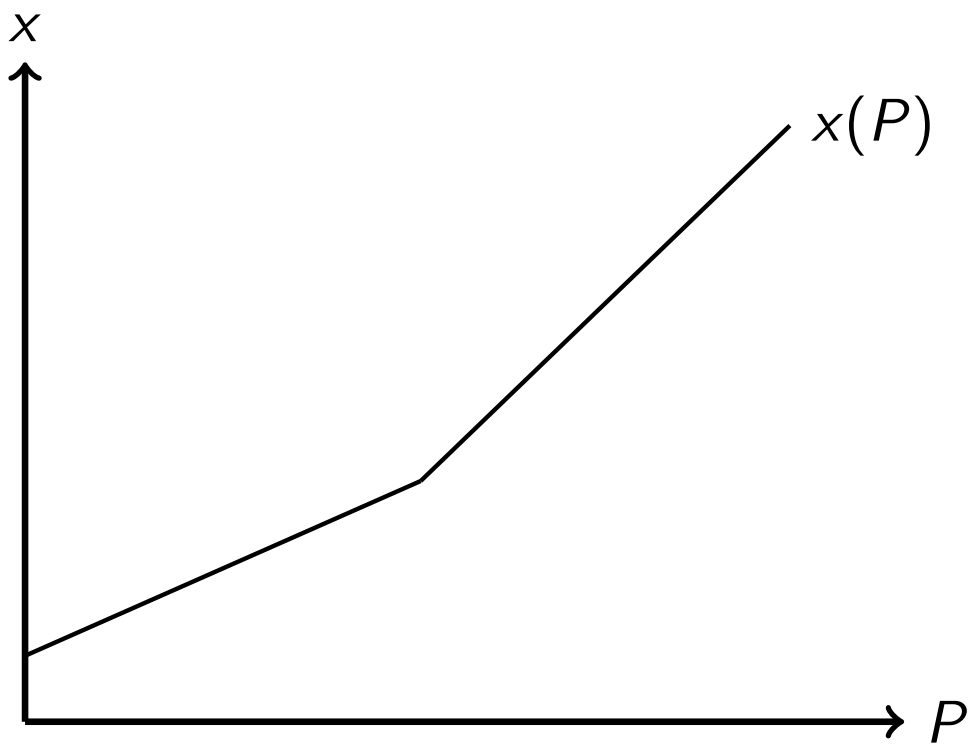

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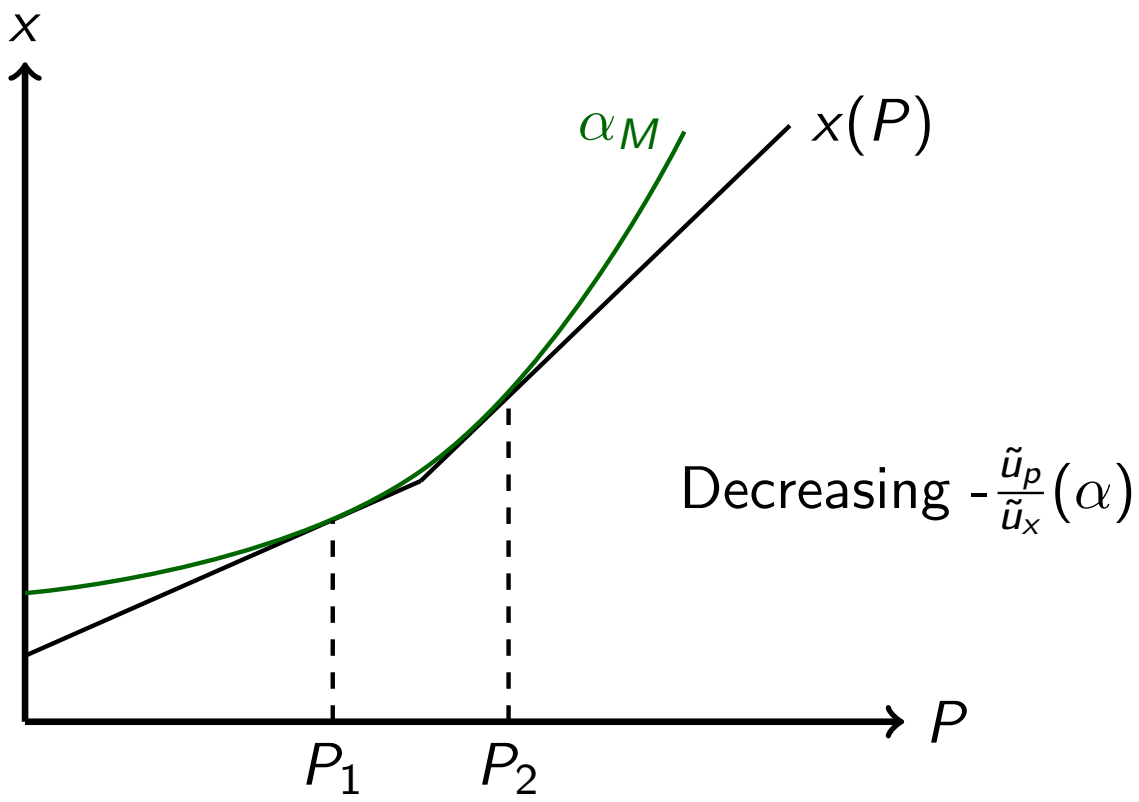

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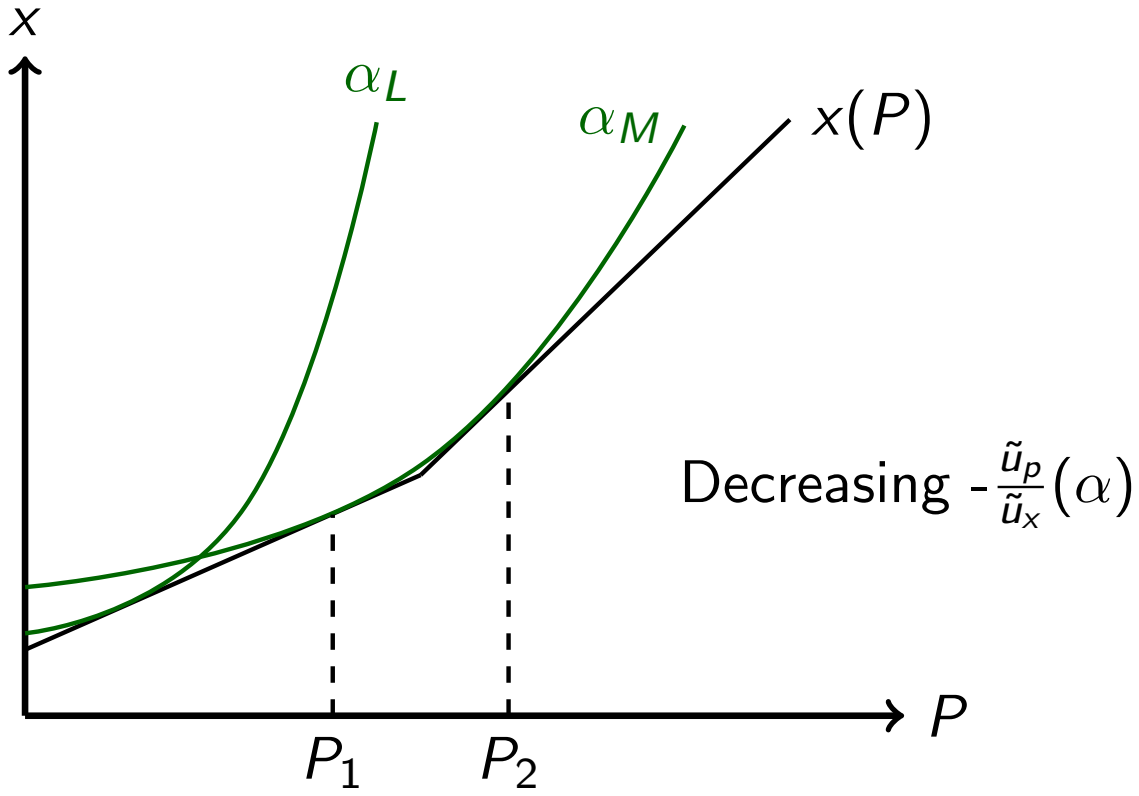

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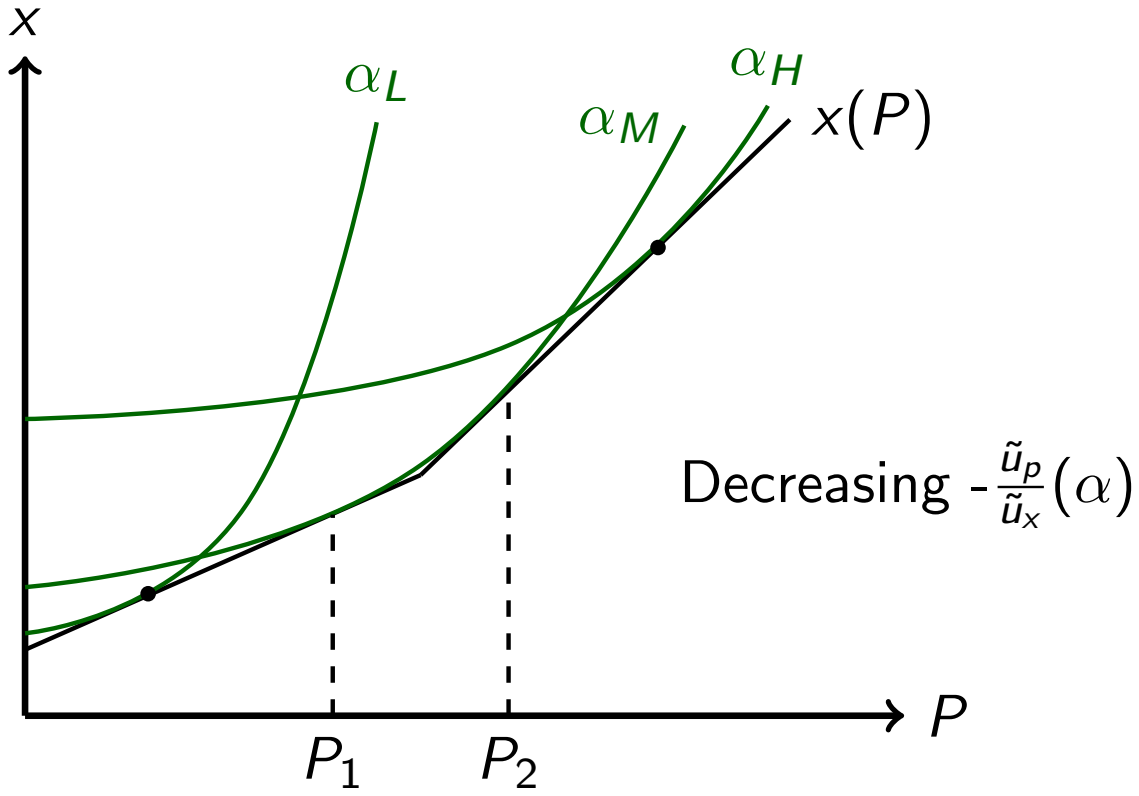

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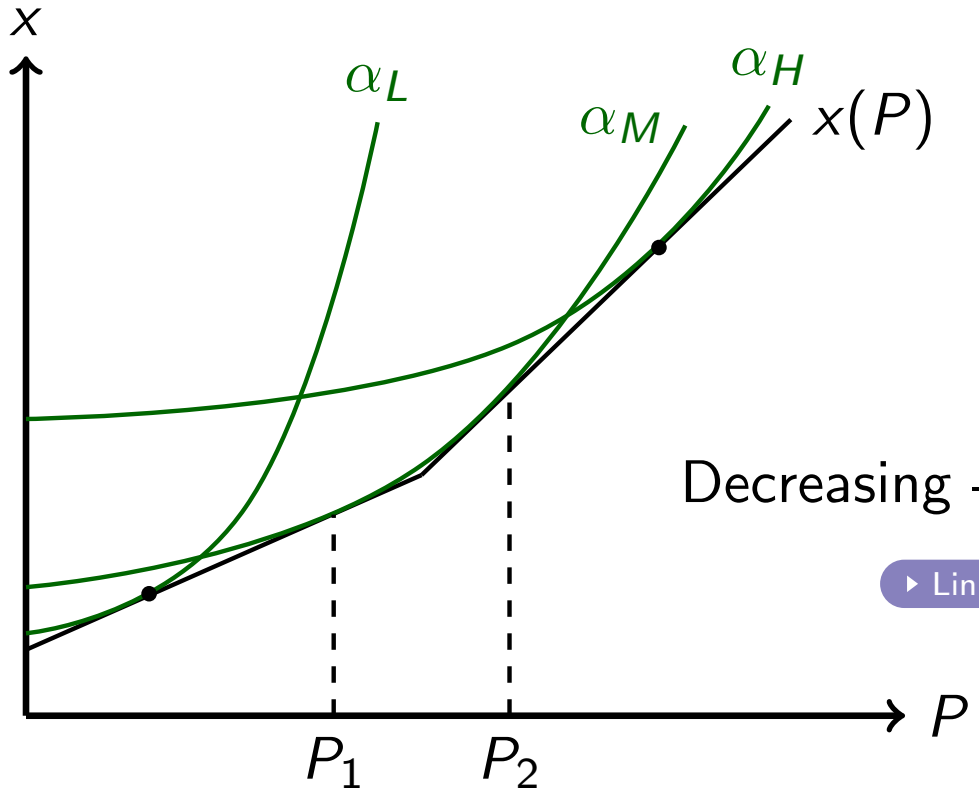

Decreasing -$\frac{\tilde{u}_p}{\tilde{u}_x}(\alpha) \Rightarrow$ Sorted Equilibrium

Link to Competitive Equilibrium Definition

Planner's Problem

$$\max_{x(\cdot)} \left\{ \int_{\alpha} v^p(\alpha) dF(\alpha) + \beta \int \min_{\alpha} v^k(\alpha, \gamma, x) dF(\gamma) \ s.t. \right.$$
$$\left. \int_0^{\infty} x(p) - tp dH(p) \leq R \right\}$$

- β: Discount factor
- $P \sim H(\cdot)$
- R: Exogenous Revenue

Elasticities

$$P(\xi, I) = \underset{P}{argmax}\ \tilde{u}\Big(x(P) + \xi P + I, P; \alpha\Big)$$

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1. $\varepsilon(P) = \frac{x'(P)}{P}\frac{\partial P(\xi,I)}{\partial \xi}\Big|_{\xi=I=0}$: Elasticity of house prices with respect to the **marginal** public school resources
2. $\eta(P) = x'(P)\frac{\partial P(\xi,I)}{\partial I}\Big|_{\xi=I=0}$: Level Effect Parameter
3. $\varepsilon^c(P) = \varepsilon(P) + \eta(P)$: Slutsky Equation

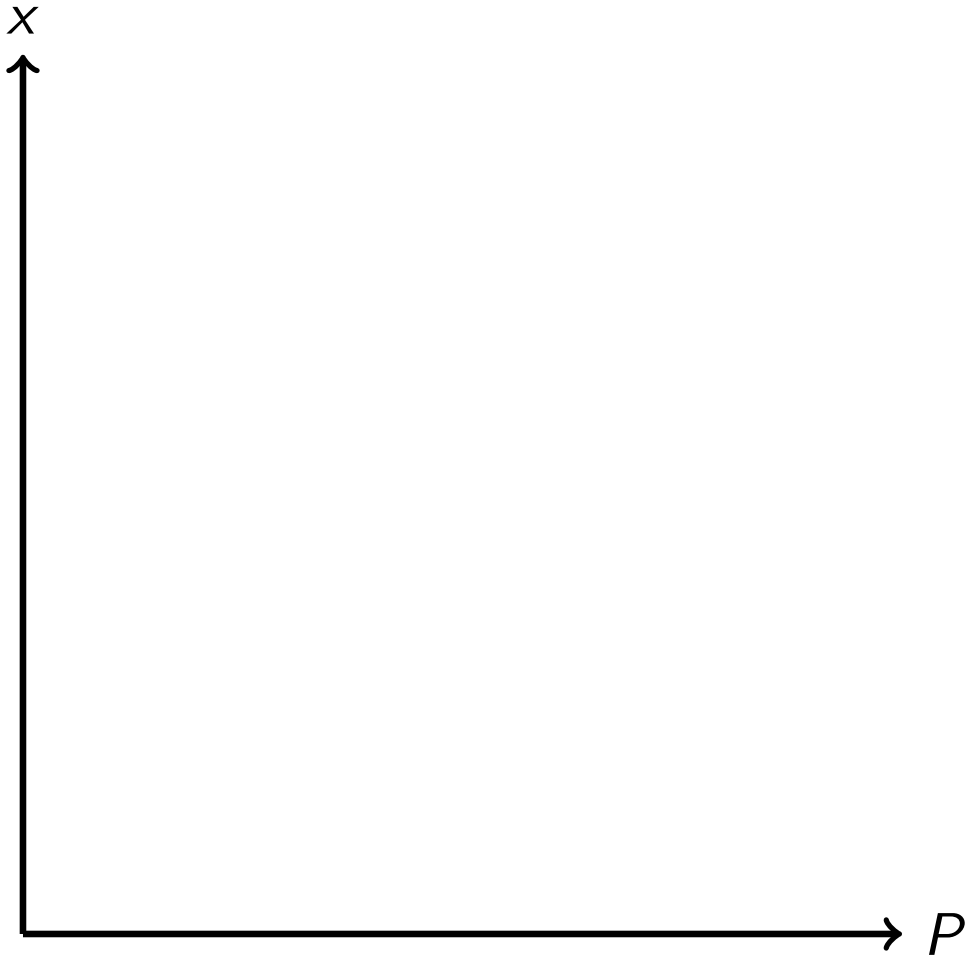
Optimal Policy

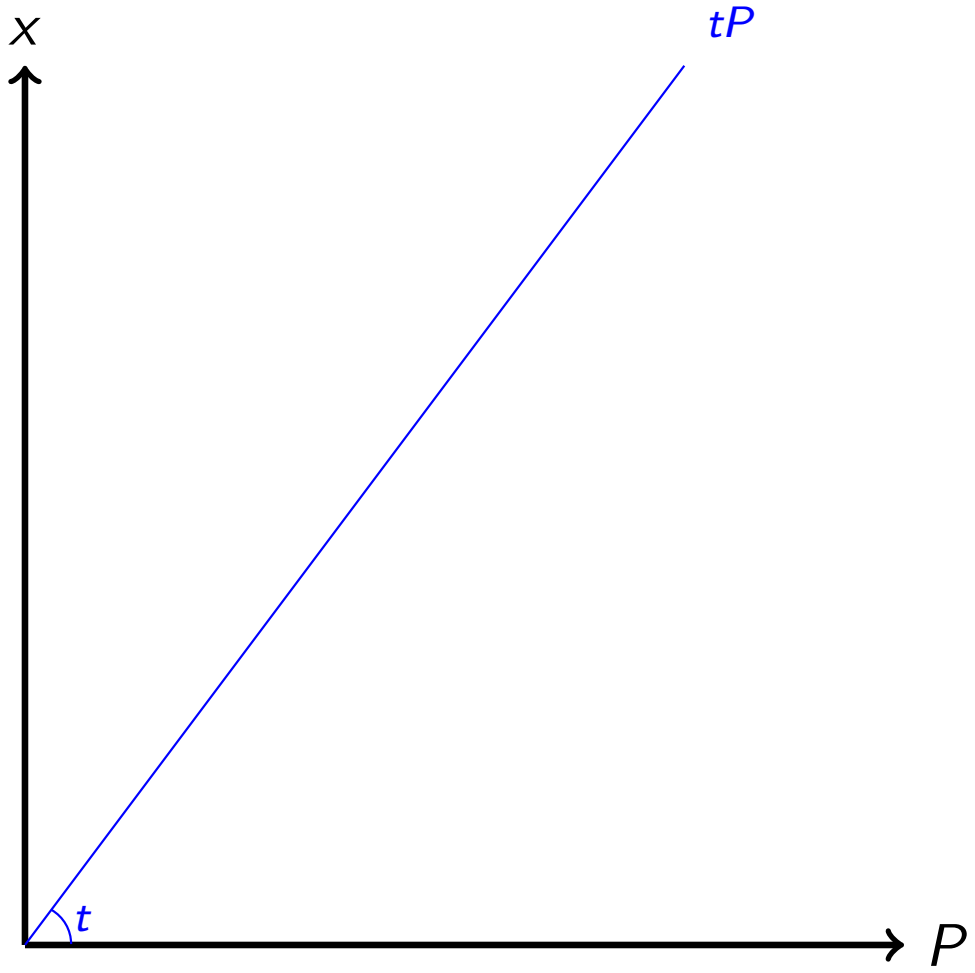
$$\frac{x'_{opt}(P)}{t - x'_{opt}(P)} = \varepsilon^c(P)h(P)P\left(\int_P^\infty 1 - g(p) - \beta eop(p) - \frac{t - x'_{opt}(p)}{x'_{opt}(p)}\eta(p)dH(p)\right)^{-1}$$

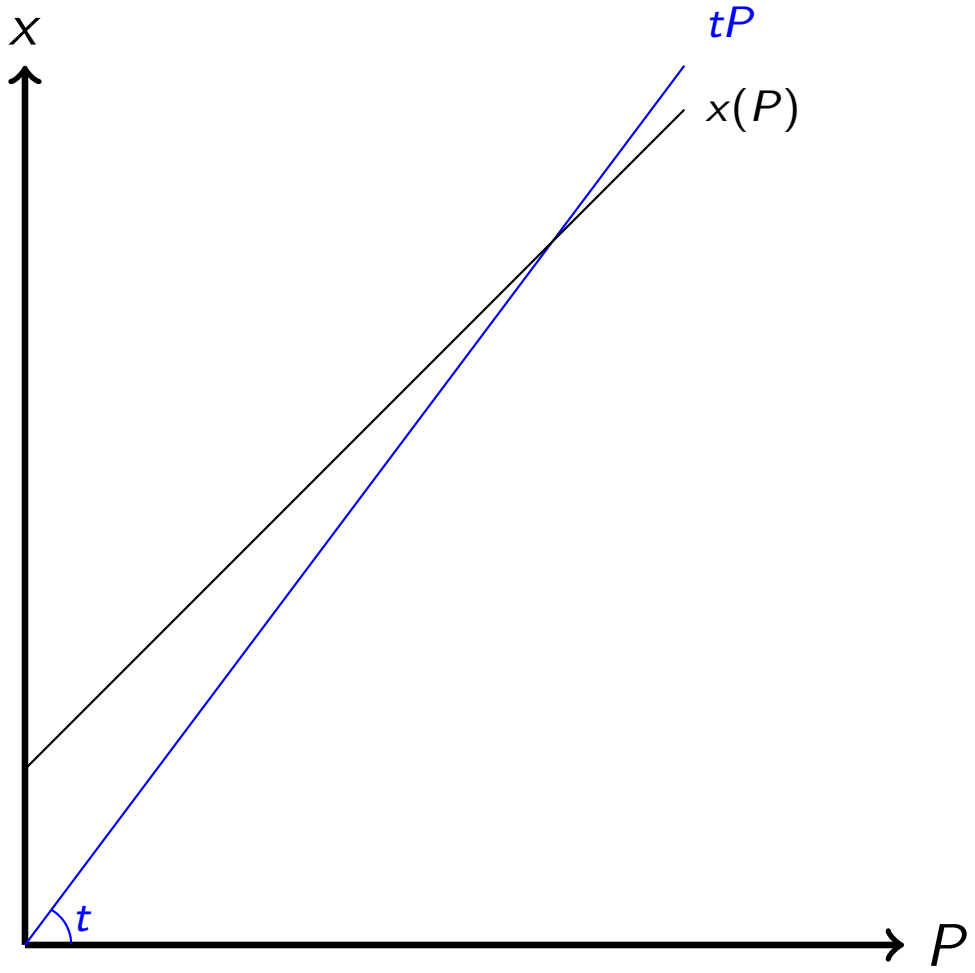
$$and \int_0^\infty x_{opt}(p) - tpdH(p) = R \ for \ P \leq P_t$$

Observations

- Larger $x'_{opt}(P)$ implies less redistribution.


X
P


x
tP
t
P


x
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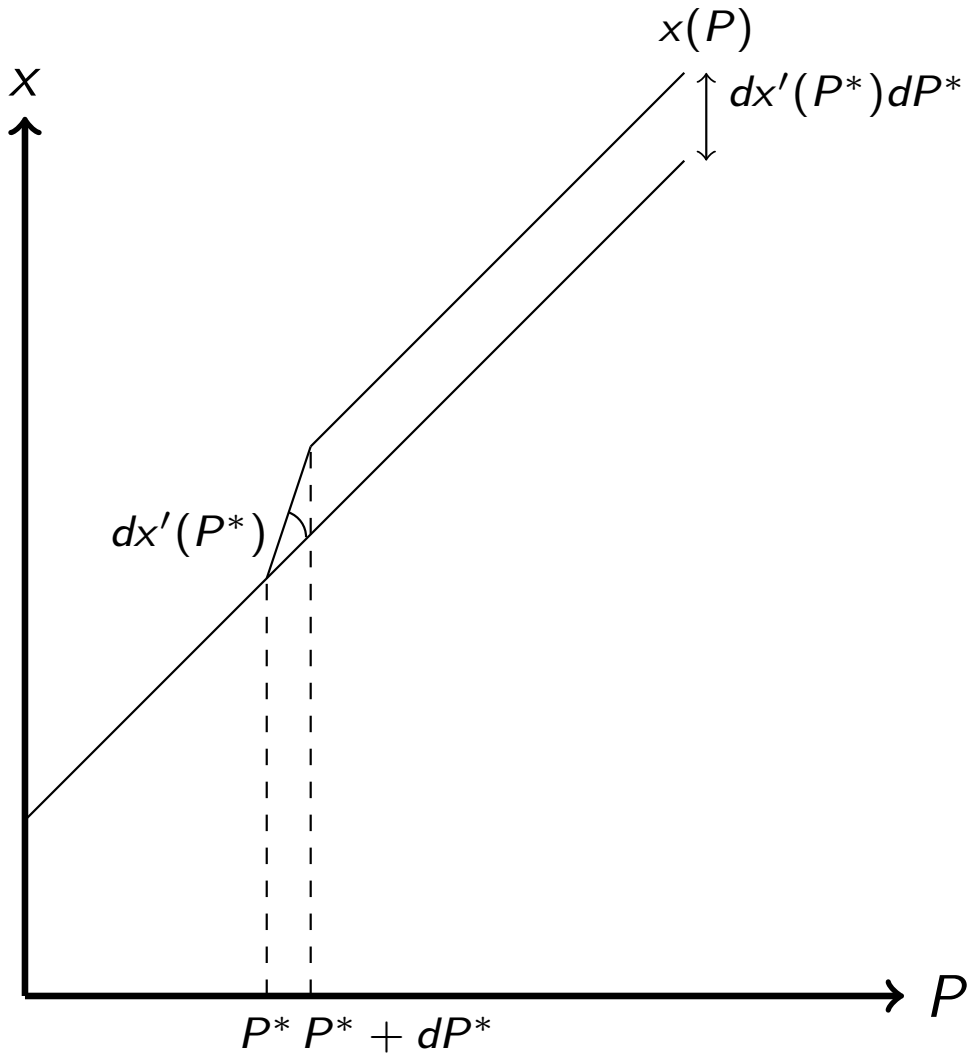
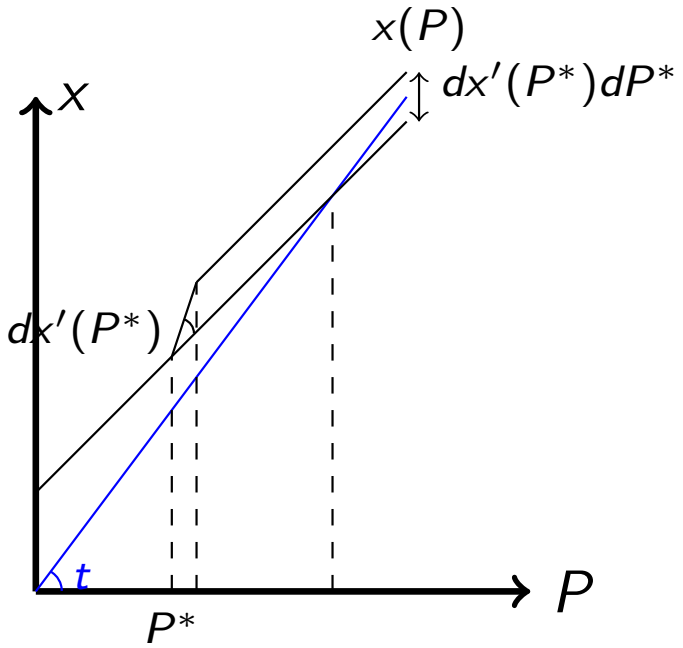
x(P)
t
P


$x(P)$
X
$dx'(P^*)dP^*$
$dx'(P^*)$
P
P^* $P^* + dP^*$

Intuition

Consider a perturbation $dx'(P^*)$ at P^*



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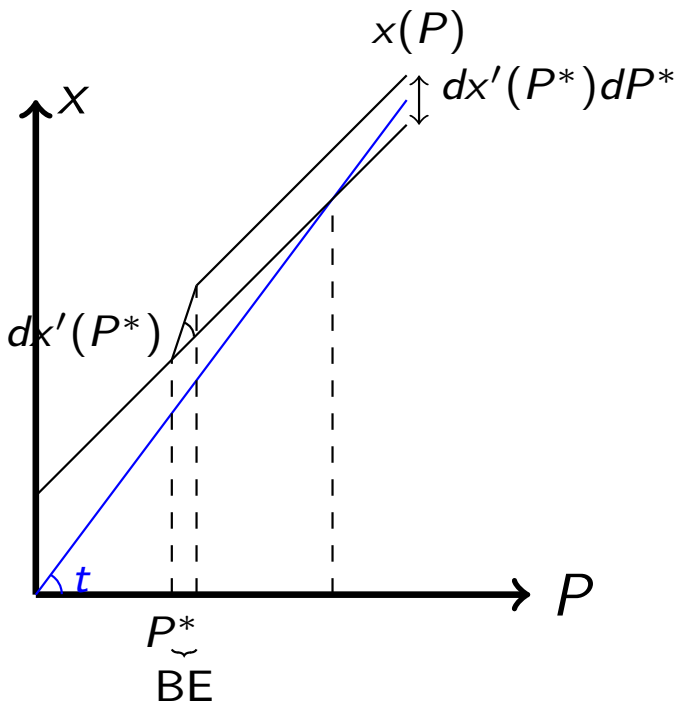

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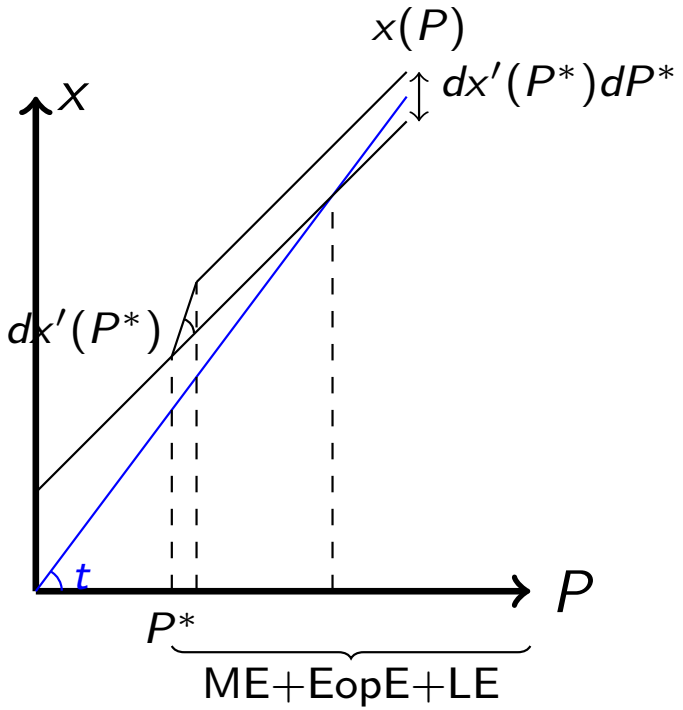
3. **EopE**: $\int_{P^*}^{\infty} g(p) + \beta eop(p)dH(p)dx'(P^*)dP^*$
4. **LE**: $\int_{P^*}^{\infty} \frac{t-x'(p)}{x'(p)}\eta(p)dH(p)dx'(P^*)dP^*$



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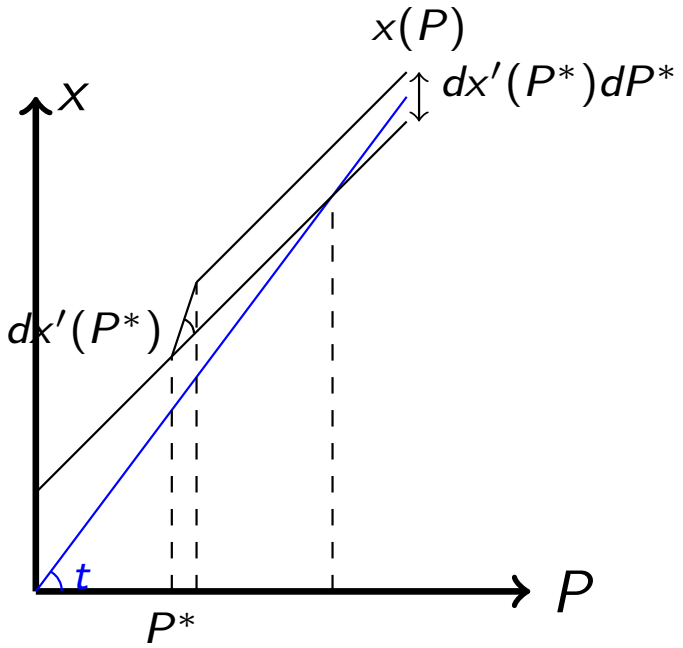
At the optimum the sum of these effects is zero.



Planner's weights

1. $g(p) = \frac{1}{\lambda}\tilde{u}_x(\alpha(p))$
   - Lump-sum transfers if this is the only concern (Tiebout) Link to Details

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- Overlapping Generations + income tax $\Rightarrow$ fiscal externality on wages
- If γ is partially circumstances $\Rightarrow$ F becomes $\tilde{F}$

Where to go?

- Endogenous human capital formation
- Bequests and access to credit
- Endogenous local taxes
- Overlapping generations + Endogenous R
- Heterogeneity of preferences for district quality
- Private schools and externalities

Generalized EOp

- $m(\gamma, x) = \min_{\alpha} u(\alpha, \gamma, x) \in M$
- $EOp : M \rightarrow \mathcal{R}_{+}$: Increasing Operator.
- $EOp\Big(m(\gamma, x)\Big)$: Equality of Opportunity Function

Table : Generalized EOp

Circumstances α	Responsibility γ Low	High	Social Criteria EOP $\min_{\gamma} m(\gamma)$	$\int m(\gamma) dF(\gamma)$
Selfish Parents	0	4	-	-
Altruistic Parents	6	10	-	-
$m(\gamma)$	0	4	0	$4 * Prob(\gamma = High)$

Back to EOp

Income Taxation

- All weight on lower circumstances and equal weights over responsibilities justifies larger tax rates (Saez and Stancheva)
- All weight on circumstances with enough weight on high responsibility justifies EITC (Jacquet et al)
- Arbitrary weights on circumstances and equal weights on responsibilities optimal tax less progressive (Lockwood and Weinzierl)
- If planner can observe circumstances he could use "tagging"

Back to Example

Competitive Equilibrium

A CE is an allocation for the parents $\{c(\alpha), h(\alpha)\}$, for the children $\{c(h,\gamma), e(h,\gamma)\}$ a price schedule $P(h,x)$, a wage production function $w(e,x,h)$ and a policy schedule $x(P)$ such that.

1. $\{c(\alpha), h(\alpha)\}$ solves the parents problem given $P()$ and $x()$
2. $\{c(h,\gamma), e(h,\gamma)\}$ solves the children problem given $w(\cdot, x, h)$.
3. Good markets clear $\int c(\alpha) + (1+t)P(h(\alpha), x)dF(\alpha) = W$
4. Housing markets clear $F(\alpha) = H(h(\alpha))$

Back to Reduced Form

Case without EOp concerns

- If $eop(p) = 0 \Rightarrow \tilde{u}_x(\alpha) = \tilde{u}_x \equiv \lambda \ \forall \alpha$
- Property taxes $x'(P) = t \ \ \forall P$ ensure that $LHS = 0 = RHS$
- "Tiebout Result"

Back to Planner's Weights