Place-Based Redistribution

Cecile Gaubert, Patrick Kline and Danny Yagan

January 13, 2021
Motivation

- Widespread use of place-based policies: 30% of EU budget, U.S., UK, France...

- Two rationales for place-based policies:
  
  1. **Efficiency**: [*Traditional focus*]
     - Internalize agglomeration/congestion externalities
     - Limit under-provision of local public goods
  
  2. **Equity**: [*This paper*]
     - Places are heterogeneous in income, opportunities, environment
     - A way to transfer resources to the disadvantaged

- **Question**: Does place-based *redistribution* improve welfare?
Redistributive motive: Poverty is spatially concentrated

West/South Chicago:
50% Poverty Rates

- Ex: U.S. Empowerment Zones 1993-present
- Cover 1% of pop. $3,000 per full-time worker.
We already redistribute based on income

West/South Chicago:
50% Filers with Negative Income Tax

Should South Side residents get *extra* transfer?
Same is true in distressed rural areas

Appalachia:
50% Poverty Rates

Should Appalachia residents get *extra* transfer?
Traditional view: No, because of efficiency costs

“‘Help Poor People, Not Poor Places’...is something of a mantra for many urban and regional economists... [Place-based] aid is inefficient because it increases economic activity in less productive places and decreases economic activity in more productive places.” – Glaeser (2008)
Our paper: Place-based redistribution can help equity-efficiency tradeoff

- **Theory**: Place-based can usefully complement income-based redistribution
  - **Lower efficiency cost** of equity gains, if limited mobility or limited earnings loss from moving
  - **Unique equity gains** from within-earnings redistribution
    - Survey evidence

- **Quantification**: Optimal transfer to 1% living in poorest tracts $\sim $3,000 – $5,500/household
  - Magnitude depends in particular on which forces drive sorting
  - Comparative advantage constitutes in itself a motive for place-based redistribution
Contributions


- Main focus: efficiency
- We characterize optimal redistribution in the workhorse urban model

**Public:** Tagging; commodity taxation [Atkinson-Stiglitz ’76, Akerlof ’78, Mirrlees ’76, Christiansen ’84, Diamond-Sheshinski ’95, Parsons ’96, Cremer-Gahvari ’98, Saez ’02, Laroque ’05, Kaplow ’06/’08, Mankiw-Weinzierl ’10, Kleven-Kopczuk ’11, Rotschild-Scheuer’13, Gordon-Kopczuk ’14, Allcott-Lockwood-Taubinsky ’19]

- Tagging: Residential choice is an area where tagging is used. Study its theoretical rationale.
- Place-based tax vs. commodity tax:
  - Place-based tax needs not be linear in consumption
  - Place: productivity differences beyond cost-of-living difference, comparative advantage
Roadmap

1. Equity gains and efficiency costs of place-based redistribution (PBR)
2. Comparison to income-based redistribution
3. Quantification
Model setup

- Model combining key elements from Urban + Public Finance:
  - Heterogeneous skill $\theta$, unobserved
  - Endogenous labor supply $\Rightarrow$ pre-tax income $z^*$, observed
  - Heterogeneous preferences for locations $\{\varepsilon_j\}$, unobserved
  - Residential choice $j^*$, observed

- Not in analysis
  - [Market failures (e.g. agglomeration spillovers, local public goods)]
  - [Incidence on landowners (see paper)]
Household preferences

- Unit mass of households $\Theta = (\theta, \varepsilon_0, \varepsilon_1) \sim F(\Theta)$ choose earnings $z$, consumption of $c, h$ and location $j$ to maximize utility:

$$U \left( c, h, a_j, \frac{z}{w_j(\theta)} \right) + \varepsilon_j$$

- Budget constraint:

$$c + r_j h = z - T_j(z)$$

- Two locations $j \in \{0, 1\} = \{Elsewhere, Distressed\}$
  - Amenities: $a_0 \geq a_1$
  - Housing rents $r_j$: $r_0 \geq r_1$
  - Productivity: $w_0(\theta) \geq w_1(\theta)$
Planner’s problem

- Planner maximizes:

\[
SWF = \int \omega(\Theta) v^*(\Theta) \, dF(\Theta) = \mathbb{E}[\omega v^*]
\]

- \(\omega(\Theta)\): Pareto weight on \(\Theta\). \(v^*\): Indirect utility.

- Define social marginal welfare weights \(\lambda^*(\Theta)\): welfare benefit of an extra $1 to household \(\Theta\):

\[
\lambda^*(\Theta) \equiv \frac{\omega(\Theta) \frac{\partial v^*(\Theta)}{\partial I}}{\phi}
\]
Redistributive tools

- Income tax $T(z)$, place-blind

- Lump-sum Place-Based Redistribution scheme (PBR), indexed by $\Delta$
  - Distressed residents receive lump-sum transfer $\frac{\Delta}{S}$ ($S$: share of households in Distressed)
  - Elsewhere residents pay lump-sum tax $\frac{\Delta}{1-S}$

Q. What is the first-order welfare effect of a small PBR reform starting from a place-blind system?
Impact of PBR on social welfare

**Proposition**

Implementing a small place-based transfer improves welfare if and only if

\[
\frac{dSWF}{d\Delta} = \bar{\lambda}_1 - \bar{\lambda}_0 - \frac{dS}{d\Delta} \cdot \mathbb{E} \left[ T(z^*_0) - T(z^*_1) | move \right] > 0
\]
Impact of PBR on social welfare

**Proposition**

Implementing a small place-based transfer improves welfare if and only if

\[
\frac{dSWF}{d\Delta} = \bar{\lambda}_1 - \bar{\lambda}_0 - \frac{dS}{d\Delta} \cdot \mathbb{E}[T(z_0^*) - T(z_1^*) | \text{move}] > 0
\]

- Equity gains depend on average social marginal welfare weights (place as a “tag”):
  \[\bar{\lambda}_1 - \bar{\lambda}_0\]
Impact of PBR on social welfare

Proposition

Implementing a small place-based transfer improves welfare if and only if

\[
\frac{dSWF}{d\Delta} = \lambda_1 - \lambda_0 - \frac{dS}{d\Delta} \cdot \mathbb{E}\left[ T(z_0^*) - T(z_1^*) | move \right] > 0
\]

- Equity gains depend on average social marginal welfare weights (place as a “tag”):
  \[\bar{\lambda}_1 - \bar{\lambda}_0\]

- Efficiency cost depends on mobility responses and earnings responses:
  \[
  \frac{dS}{d\Delta} \cdot \mathbb{E}\left[ T(z_0^*) - T(z_1^*) | move \right] > 0
  \]
When equity gains come at no efficiency cost: Special cases

**Neighborhood Zones**

PBR between affluent/poor residential neighborhoods with same access to business district:

- no earnings loss upon moving $\Rightarrow$ no efficiency cost of PBR

**Moving costs** [Sjaastad '62, Kennan-Walker '10/'11, Bayer-McMillan-Murphy-Timmins '16]

$U_{\text{Distressed}} < U_{\text{Elsewhere}}$, but households stay in Distressed because of high moving costs

- no household wants to pay a moving cost to move to Distressed, even after PBR
- no movers
$\Rightarrow$ no efficiency cost of PBR

**Comp. advantage/Skilled jobs clustering** [Moretti '12, De la Roca-Puga'17, Autor '19]

High-skilled/high-wage jobs only in Elsewhere; low-skilled jobs in both areas, same low wage.

- high-skill not incentivized to move to Distressed; only low-skill move
- no earnings loss of movers
$\Rightarrow$ no efficiency cost of PBR
When equity gains come at no efficiency cost: Special cases

**Neighborhood Zones**

PBR between affluent/poor residential neighborhoods with same access to business district:

- no earnings loss upon moving $\Rightarrow$ no efficiency cost of PBR

**Moving costs** [Sjaastad '62, Kennan-Walker '10/'11, Bayer-McMillan-Murphy-Timmins '16]

$U(\text{Distressed}) < U(\text{Elsewhere})$, but households stay in Distressed because of high moving costs

- no household wants to pay a moving cost to move to Distressed, even after PBR
- no movers $\Rightarrow$ no efficiency cost of PBR
When equity gains come at no efficiency cost: Special cases

1. **Neighborhood Zones**
   PBR between affluent/poor residential neighborhoods with same access to business district:
   - no earnings loss upon moving $\Rightarrow$ no efficiency cost of PBR

2. **Moving costs** [Sjaastad '62, Kennan-Walker '10/'11, Bayer-McMillan-Murphy-Timmins '16]
   $U(\text{Distressed}) < U(\text{Elsewhere})$, but households stay in Distressed because of high moving costs
   - no household wants to pay a moving cost to move to Distressed, even after PBR
   - no movers $\Rightarrow$ no efficiency cost of PBR

3. **Comp. advantage/Skilled jobs clustering** [Moretti '12, De la Roca-Puga'17, Autor '19]
   High-skilled/high-wage jobs only in Elsewhere; low-skilled jobs in both areas, same low wage.
   - high-skill not incentivized to move to Distressed; only low-skill move
   - no earnings loss of movers $\Rightarrow$ no efficiency cost of PBR
Increase PBR until additional equity gains are outweighed by additional efficiency costs:
  - Efficiency costs include impact of movers on PBR budget

**Proposition**

The optimal place-based transfer $\Delta^*$ obeys:

$$
\Delta^* = \frac{\bar{\lambda}_1(\Delta^*) - \bar{\lambda}_0(\Delta^*) - \frac{dS(\Delta^*)}{d\Delta} \mathbb{E} [T(z_0^*) - T(z_1^*) | move]}{\frac{dS(\Delta^*)}{d\Delta} / [S(\Delta^*)(1 - S(\Delta^*))]}.
$$
When does PBR usefully complement income-based redistribution?

- Couldn’t an income tax reform dominate this place-based reform?

- **Compare PBR to an income tax reform** \( q \tilde{T}(z) \) that raises same tax at each earnings level

\[
\tilde{T}(z) \propto S - s(z)
\]

where \( s(z) \): share of \( z \)-earners who live in Distressed

- PBR useful in complement to place-blind redistribution if:

\[
\text{Difference in Equity Benefits} - \text{Difference in Efficiency Costs} \geq 0
\]
1. Difference in Efficiency costs
PBR desirability: reduce efficiency costs

- Difference in Efficiency costs:
  - PBR: as above, cost of movers; Income tax: distorts labor supply

\[
\left( \frac{dS}{d\Delta} - \frac{dS}{dq} \right) E \left[ T(z_0^*) - T(z_1^*) \mid \text{move} \right] - E \left\{ -T'(z^*) \frac{s'(z^*)}{S(1-S)} \frac{Z_{1-\tau}}{1 + Z_{1-\tau} T''(z^*)} \right\}
\]

  - Horserace. Low if: limited migration/earnings losses of movers; large labor supply responses

- In commodity taxation lit., what drives sorting is important for net efficiency cost [Saez '02]
  - Homogeneous pref. & sorting only driven by income effect: commodity tax does not help
  - If sorting driven by other forces (e.g. heterogeneous preference): commodity tax may help
  - Silent on sorting driven by comparative advantage

- Come back to this question in quantification:
  - Embed sorting forces from urban literature – heterogeneous preferences for location amenities; comparative advantage; non-homothetic preferences for housing
2. Difference in Equity Benefits

PBR desirability: unique equity gains

- In isolation, PBR’s equity gains depend on how $\lambda(\Theta)$ covaries with location choice of households:
  \[ C(\lambda, j^*) \]

- Income tax reform takes care of across earnings redistribution
  \[ \Rightarrow \text{PBR’s unique (net) equity gains are within earnings} \]
  \[ C(\lambda, j^* | z^*) \]

- Unique equity gain of PBR if, at the same income level $z$, households living in Distressed have a higher $\lambda$ than those who live in Elsewhere
Rationale for within-earnings redistribution $\lambda_1(z) \geq \lambda_0(z)$

- Consider case where labor supply is separable to isolate key driving forces

$$U = \psi(g(c, h), a_j) - e\left(\frac{z}{w(\theta)}\right)$$

- with $g(c, h)$ homothetic consumption index

**Cost-of-living effect:** $P_0 > P_1 \Rightarrow \lambda_1(z) \geq \lambda_0(z)$ if $\psi$ not too concave

- Households are poorer in real terms in Elsewhere
- A govt dollar spent in Distressed goes further, as prices are lower
- Dominates when $\psi$ not too concave.
Rationale for within-earnings redistribution $\lambda_1(z) \geq \lambda_0(z)$

- Consider case where labor supply is separable to isolate key driving forces

$$U = \psi(g(c, h), a_j) - e\left(\frac{z}{w(\theta)}\right)$$

- with $g(c, h)$ homothetic consumption index

**Cost-of-living effect:** $P_0 > P_1 \Rightarrow \lambda_1(z) \geq \lambda_0(z)$ if $\psi$ not too concave
  - Households are poorer in real terms in Elsewhere
  - A govt dollar spent in Distressed goes further, as prices are lower
  - Dominates when $\psi$ not too concave.

**Amenity effect:** $a_1 < a_0 \Rightarrow \lambda_1(z) \geq \lambda_0(z)$ if amenities - consumption q-substitutes $(\frac{\partial^2 \psi}{\partial g \partial a} < 0)$
  - Disamenities raise the marginal utility of consumption
  - e.g. car rides to avoid crime, healthcare needs and pollution
Disamenities that can raise the marginal utility of consumption

High-Poverty Tracts Have More Murders

Air pollution (micrograms of ambient particulate pollution per cubic meter)

High-Poverty Tracts Have Higher Pollution
Consider separable case in consumption and/or amenities to isolate key driving forces

\[ U = \psi(g(c, h), a_j) - e\left(\frac{z}{w(\theta)}\right) \]

- with \( g(c, h) \) homothetic consumption aggregate

1. **Cost-of-living effect**: \( P_0 > P_1 \Rightarrow \lambda_1^z > \lambda_0^z \) so long as \( \psi \) not too concave
   - dollar spent goes further in buying consumption in low-price location

2. **Amenity effect**: \( a_1 < a_0 \Rightarrow \lambda_1^z > \lambda_0^z \) if amenities and consumption are q-substitutes \( \frac{\partial^2 \psi}{\partial g \partial a} < 0 \)
   - lower amenities in 1 raises marginal utility of consumption, e.g. car rides to avoid crime

3. **Equality and justice**: Residents of Distressed are more deserving \cite{Wilson87}
   - suffer from past injustices, unfair treatment
   - can be folded into high Pareto weights \( \omega(\Theta) \) \cite{SaezStantcheva16}
High poverty neighborhoods and past injustices

High-Poverty Tracts Were 5x More Likely Redlined

Graph showing the correlation between poverty rate and the share designated a hazardous neighborhood for mortgage lending in 1935 ('redlined').
Rationale for within-earnings redistribution (Why place can be special)

- Consider separable case in consumption and/or amenities to isolate key driving forces

\[ U = \psi(g(c, h), a_j) - e\left(\frac{z}{w(\theta)}\right) \]

- with \( g(c, h) \) homothetic consumption aggregate

1. **Cost-of-living effect**: \( P_0 > P_1 \Rightarrow \lambda_z^1 > \lambda_z^0 \) so long as \( \psi \) not too concave
   - dollar spent goes further in buying consumption in low-price location

2. **Amenity effect**: \( a_1 < a_0 \Rightarrow \lambda_z^1 > \lambda_z^0 \) if amenities and consumption are q-substitutes \( \left( \frac{\partial^2 \psi}{\partial g \partial a} < 0 \right) \)
   - lower amenities in 1 raises marginal utility of consumption, e.g. car rides to avoid crime

3. **Equality and justice**: Residents of Distressed are more deserving [Wilson '87]
   - suffer from past injustices, unfair treatment
   - can be folded into high Pareto weights \( \omega(\Theta) \) [Saez and Stantcheva '16]
Survey: preferences for redistribution within-earnings/across place?

- Survey of 1,100 Americans on Amazon MTurk [e.g. Kuziemko-Norton-Saez-Stantcheva '15]

- Elicit social preference between 3 reforms. All 3 reforms have the **same budget** and are for families with an **identical low income**:
  1. distributed to poor families everywhere
  2. targeted to poor families living in distressed areas
  3. targeted to poor families living in thriving areas

- Suggests social preference for redistribution across place, within earnings, towards Distressed areas
Quantification: How large might optimal place-based transfers be?
Quantification: How large might optimal place-based transfers be?

- Compute optimal transfer scheme to the 1% who live in poorest group of tracts
  - Rank U.S. Census tracts by poverty rates (2013-2017 ACS)
  - Combine into 100 location groups, each with 1% of the population

- Utilitarian planner maximizes $SWF = \mathbb{E}[v^*]$ using three-bracket income tax $T(\cdot)$ and also PBR $\Delta$
  - Baseline SWF features no within-earnings/ across place redistributive motive.
  - Focus on PBR as a means to reduce efficiency costs.
Baseline utility:

\[ u_j(\Theta) = \ln \left( c^{1-\alpha} h^\alpha - \frac{\eta}{1 + \eta} \left( \frac{z}{w_j(\theta)} \right)^{1+\eta} \right) + a_j(\theta) + \frac{1}{\kappa} \varepsilon_j \]

- Taste shock: \( \varepsilon_j \sim \text{EV1} \).
- Productivity advantage of locations is skill-neutral: \( w_j(\theta) = \theta w_j \)
- \( \lambda_1(z) = \lambda_0(z) \)
- Skill-specific mean taste for amenities \( a_j(\theta) \) drives sorting

Add comparative advantage:

- Productivity advantage of locations is skill-biased: \( w_j(\theta) = w_j \theta^{b_j} \)
- Induces sorting of high-skill into high-wage communities

Add income-based sorting:

- Use Stone-Geary instead of Cobb-Douglas in consumption: \( c^{1-\alpha}(h - h)^\alpha \)
- Housing is a necessity, induces sorting of low-skill into low-rents communities
\[ u_j(\Theta) = \ln \left( c^{1-\alpha} h^\alpha - \frac{\eta}{1 + \eta} \left( \frac{z}{\theta w_j} \right)^{\frac{1+\eta}{\eta}} \right) + a_j(\theta) + \frac{1}{\kappa} \varepsilon_j; \quad \theta \sim \log\text{-normal}(\mu_\theta, \sigma_\theta). \]

Baseline Calibration:
- Rents \( \{r_j\} \): ACS.
- Wage shifters \( \{w_j\} \): from productivity-rent gradient [Hornbeck-Moretti'19]
- \( \kappa = 0.5 \): matches population elasticity wrt wage [Kennan-Walker '11]
- Housing expenditure share \( \alpha = 0.3 \). Frisch labor supply elasticity \( \eta = 0.5 \) [Chetty et al. '11].
- Current \( T(z) \): $11K lump-sum transfer w/ brackets 44%, 16%, 27% [Piketty-Saez-Zucman '18]
- Skill-specific valuation of amenities \( \{a_j(\theta)\} \) (and \( \mu_\theta, \sigma_\theta \)): residual to match distribution of ACS earnings (9 earnings bins) and total population across locations.

Extensions:
- Comparative advantage: \( \{b_j\} \) indexed on \( \{w_j\} \) to match estimate in [DeLaRoca-Puga'17]
- Non-homothetic preferences: \( (\alpha, h) \) match housing share between 0.15 and 0.52
Substantial income sorting in the data...

Empirical Sorting Targets

- Poor (HH labor earnings < $4K)
- Rich (HH labor earnings > $180K)
... Rationalized by place productivity + skill-specific valuation of amenities

Baseline calibration
## Optimal PBR: Baseline Results

<table>
<thead>
<tr>
<th></th>
<th>Optimal level of PBR</th>
<th>Social marginal welfare weight difference narrowed</th>
<th>Increase in Distressed population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>$5,500</td>
<td>71%</td>
<td>9%</td>
</tr>
<tr>
<td>Capped earnings subsidy</td>
<td>36%</td>
<td>54%</td>
<td>7%</td>
</tr>
<tr>
<td>Change top income tax bracket only</td>
<td>$3,600</td>
<td>49%</td>
<td>6%</td>
</tr>
<tr>
<td>2x productivity differences</td>
<td>$4,800</td>
<td>63%</td>
<td>8%</td>
</tr>
<tr>
<td>2x migration</td>
<td>$4,000</td>
<td>53%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Extensions account for other sorting forces

- Add comparative advantage of high skill in high-wage cities
- Add income-based sorting
- Residual role of skill-specific valuation of amenities is muted compared to baseline
Optimal PBR with additional sorting forces

Optimal Level of PBR

<table>
<thead>
<tr>
<th></th>
<th>Calibration</th>
<th>Eliminate skill-taste correlation after calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Baseline</td>
<td>$5,500</td>
<td>$400</td>
</tr>
<tr>
<td>Income effects</td>
<td>$3,700</td>
<td>-$400</td>
</tr>
<tr>
<td>Comparative advantage</td>
<td>$4,200</td>
<td>$1,600</td>
</tr>
<tr>
<td>Income effects + Comparative advantage</td>
<td>$3,100</td>
<td>$700</td>
</tr>
</tbody>
</table>

- Optimal PBR in the range of $3,100-$5,500 depending on sorting forces
- Comparative advantage in isolation provides motive for PBR
Conclusion

- Place-based redistribution can deliver unique equity and efficiency benefits
  - Efficiency of taxation: Better targeting when mobility or wage differences are low
  - Equity: Unique gains when marginal utilities differ across place, within-earnings

- No presumption against helping poor places
Appendix
Why direct subsidies to the poor to distressed areas?

- 78% Low amenities
- 44% Justice
- 39% Higher spending needs
- 34% Dollar goes further

**Poor families in the distressed area are worse off, since they deal with high poverty, high crime, high pollution, struggling schools, and a history of job losses.**

**Poor families in distressed areas are more deserving, since they are more likely to be poor due to circumstances beyond their control.**

**An extra dollar goes further in the distressed area, since poor families there have greater spending needs like supplementing school instruction, replacing stolen goods, or treating asthma from high pollution.**

**An extra dollar goes further in the distressed area, since housing costs and other services are cheaper.**
Optimal PBR

The optimal place-based transfer \( \Delta^* \) obeys:

\[
\Delta^* \approx \frac{\bar{\lambda}_1 (0) - \bar{\lambda}_0 (0) + \mathbb{E} \left\{ \frac{dS(\cdot,0)}{d\Delta} \left[ T \left( z_1^* \right) - T \left( z_0^* \right) \right] \right\}}{\frac{dS}{d\Delta} - \mathbb{E} \left[ \frac{dS(\cdot,0)}{d\Delta}, (1 - S) \lambda_1 (\cdot,0) + S \lambda_0 (\cdot,0) \right]} - \left( \bar{\Lambda}_1 (0) + \bar{\Lambda}_0 (0) \right) - \mathbb{E} \left\{ \frac{d^2 S(\cdot,0)}{d\Delta^2} \left[ T \left( z_1^* \right) - T \left( z_0^* \right) \right] \right\},
\]

where: \( \Lambda (\Theta) = \frac{\partial \lambda (\Theta)}{\partial I} \) and \( \bar{\Lambda}_j = \mathbb{E} [\Lambda (\cdot) | j^* = j] \)

both evaluated at \( \Delta = 0. \)