Why should we tax public land?

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Preliminary

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Public land

- Local public good: some piece of land, common land
- Streets, roads, squares, railways, public parks, sidewalks, footpaths, public forest, recreation parks, ponds, and lakes on the municipality's territory.
- Plus the land on which public buildings are constructed
- More public land means less private land for housing: rivalry use and less taxable basis.
- Rivalry use even more pregnant with the act of « Net zero land take » in Fr.

Anecdotal?

- At the French national level, public land = 13% of total land value
- Over 2006-2019, 31% increase higher than for households (21%)
- Paris city
  - Excluding highways, roads, 46% of Paris area is owned publicly.
  - 29% of Paris land owned by Paris municipality and social housing bodies.

Common wisdom

- Taxing privately owned land to finance local public goods
  - The Henry-George Theorem (Arnott-Stiglitz 1979)
  - Capitalization of public-good amenities
- Privately owned land should either be taxed or nationalized
  - Henry George: single tax
  - Walras: nationalized and leased to private sector
- Taxing public land appears contradictory

The framework

- An issue for LGs
  - Likely owns the vast majority of local public land (true for France: 77% of public land owned by LG)
  - Maybe an issue for intervention by a central authority
- LG decides through a democratic process
- We do not tackle the issue of the population allocation between the various LGs (Tiebout approach)

Results

- If the LG leases public land, taxing private land is efficient.
- However, in case of LGs purchasing public land, taxing private land does not provide an efficient allocation
- The distorsion cannot be alleviated by the LG
- The distorsion can be partially corrected by a tax on local public land by a central authority (Federal Gvt)
- Uniform taxation of land whether the owner is public or private is desirable, but involve two levels of Gvts.

Outline

1. Model
2. Efficiency conditions
3. A sort of Walras/Nash mechanism for decentralization: an idealization of the equilibrium for a small local economy
4. Two set-ups
    1. The LG leases land for public uses and chooses the land tax rate
    2. The LG purchases/sells land and chooses the land tax rate
5. Correcting the distortion
    1. Self-inflecting solutions: a dead end.
    2. Intervention of the Federal Gvt taxing public land of LG
6. Discussion

1. The model

- k constituencies. Each constituency: a closed economy like islands in Arnott and Stiglitz

- Private sector: Augmented Judd model by introducing land and housing (Bonnet, Chapelle, Trannoy, Wasmer, 2021)
  - Two classes
  - Workers-tenants (weight 1)
  - Capitalists-landlords (weight m) own productive capital and lands. They rent to workers and build up structures for housing
  - Capital and housing accumulation
  - Competitive firms with CRS

- Fixed population = N(1+m)
- Land (homogeneous good) in fixed quantity $\bar{L}$: area of the municipality
- Public land L^G : a pure public consumption good

Notations

- c: worker consumption
- h: worker housing

- C: capitalist consumption
- H: capitalist housing

- Housing production functions: h=h(l,s), H=H(L,S)
- Land constraint: $\bar{L} = l + mL + L^G$

- u(c,h,L^G): Representative worker utility
- U (C,H,L^G): Representative capitalist utility

- K: Capital stock used with worker labor (fixed) to produce good

2. Efficiency conditions

- Warning: We assume Focs gives necessary and sufficient conditions for an optimum
- The social planner maximizes the intertemporal SWF with γ the social welfare weight of capitalist. (γ can change over time)

$$Max_{C_t,c_t,\mathcal{L}_t,l_t,\mathcal{L}_t^G,S_{t+1},s_{t+1},K_{t+1}}$$

$$\sum_t \beta^t \left\{u[c_t, h(\overline{\mathcal{L}} - \mathcal{L}_t^G - m\mathcal{L}_t, ms_t), \mathcal{L}_t^G) + \gamma m U\left[C_t, H(\mathcal{L}_t, S_t), \mathcal{L}_t^G\right]\right\}$$

$$+\beta^t \lambda_t \left\{f(K_t\} + (1-\delta)K_t + (1-\delta_s)m(S_t + s_t)\right.$$

$$\left.-c_t - mC_t - m(S_{t+1} + s_{t+1}) - K_{t+1}\right\}$$

Useful FOCs at a Pareto allocation

- Euler conditions about investments in productive capital and structures +

$$
\begin{aligned}
u'_c(t) &= \gamma U'_C(t) \\
\frac{u'_h(t)h'_l(t)}{u'_c(t)} &= \frac{U'_H(t)H'_{\mathcal{L}}(t)}{U'_C(t)} \\
u'_{\mathcal{L}^G}(t) + \gamma m U'_{\mathcal{L}^G}(t) &= u'_h(t)h'_l(t)
\end{aligned}
$$

- Samuelson condition

3. The Walras-Nash equilibrium

- Can we implement an efficient allocation respecting the Samuelson condition by a decentralized mechanism with a land tax(es)?

- Decentralized mechanism: fixed point somehow

- We consider a decentralized mechanism with a priori the best properties in terms of efficiency. If inefficiency comes out, it will come from the fiscal rule.

- Private actors, workers and capitalists price-takers and tax-takers

The LG decision process

- Representatives of each social class are elected to the local council for a term corresponding to one period.

- Elected representatives maximize a weighted sum of utility functions on the level of public variables
  - The amount of public land
  - The local tax rates on private property of land

- For convenience, the social welfare weights are identical to that considered in the Pareto allocation.
  - We do not explicit the voting game. Banks and Duggan (2005) shows the set of probabilistic voting equilibria with two candidates (two lists) coincide with the set of utilitarian optima.
  - Reduced form model for probabilistic voting between 2 lists

- Local public finance constraint.
  - Public expenditures at time t = Fiscal revenues from land tax + Grant at time t

Revelation of information (I)

- In the framework, the problem of the revelation of information regarding the willingness to pay is not as acute as in other models (Lindhal)
  - Two classes of identical agents.
  - The marginal willingness to pay for the public good won’t impact directly the individual tax price.

Revelation of information (ii)

- The selection process to be on a list for local election a partial response to overcome asymmetric information between deciders and voters

- Two criteria
  - Loyalty to some general political options and to the list leader
  - The fact of being known and of being seen as a representative of the interests of a professional network

- The benefits associated to the second criterion
  - Contact people to persuade them to vote for the list
  - Get information about what people want in their respective professional network (shopkeepers, workers, doctors,…) about public good

Citizenship assumption

- When representatives serve on the town council, they act as local citizens and they forget their personal interest in the contracting relationship with the LG (in selling land plots!)

- A public economics view and not a public choice

- Evidence that it should be the social norm for representatives is the mere fact that the courts severely condemn local elected officials who confuse their personal interests with those of their constituents

Why Nash?

- The private agents in their plans (in the tatonnement) take as given the plans of the LG.
  - The best response of tax rate and public land takers

- The LG in its plan takes as given the decisions of the private agents regarding prices, consumptions and investments
  - It conditions its decision on the level of capital investment, housing investment, wage, worker housing land, capital housing land, worker and capitalist structures
  - Let's denote them $\overline{X_t}$
  - The best response of LG wrt to private agent choices

Still Walras

- Regarding land, we are in an exchange economy
- There is already a land market (for renting) and an equilibrium rent
- The LG a price taker regarding land price.
- All in all, « competitive » Walras Nash
- Different from Nash Walras mechanism defined by Ghoshal &Polemarchakis 1997, Minelli and Polemarchakis 1999 where they enlarge the setting to contracts for which strategic manipulation can occur.

Definition of a Walras-Nash mechanism

- Let aside the issue of expectations beyond the current period for now.

Definition 2 *A Walras-Nash equilibrium is an allocation* $(X_t^*, \mathcal{L}_t^{G*})$ *and a price and tax vector* $(R_t^{\mathcal{L}gross*}, \tau_t^*)$ *that*

(i) satisfies the resource constraint of each agent

(ii) X_t^* solve the Focs of each agent of the private economy for $(\overline{\mathcal{L}_t^G}, \overline{\tau}_t) = (\mathcal{L}_t^{G*}, \tau_t^*)$

(iii) $\mathcal{L}_t^{G*}, \tau_t^*$ solve the Foc of the Local Gvt for $\overline{X}_t = X_t^*$

(iv) satisfies the land constraint

(v) the land market and the housing market clear in a competitive way

A non-cooperative equilibrium? Yes

- Exchange of information
  - The LG publicly announces tax and public good quantity.
  - The city-council members, workers and capitalists, know their own X_t value
  - They allow the LG to compute its demand for public land with the right information.

- In that, some flavour of the MDP planning process.

- For existence, no particular worry. At the end, the matter is the intersection of land supply by capitalists and the land demand by LG.

- We assume standard conditions for the existence of a fixed point are met.

4.1 Public land lease

- Notations

R_t^{Kgross} : gross return on capital
R_t^{hgross} : gross return on housing
$R_t^{\mathcal{L}gross}$: gross return on land
$\overline{\tau}_t$: land tax rate

- Capitalist program

$$Max_{C_t,\mathcal{L}_t,S_{t+1},s_{t+1},K_{t+1},\mathcal{L}_t^G} \sum_t \beta^t \left\{ U\left[C_t, H(\mathcal{L}_t, S_t), \overline{\mathcal{L}_t^G} \right] \right\}$$

$$+\beta^t \lambda_t^C(\overline{\tau}_t, \overline{\mathcal{L}_t^G}) \left\{ \begin{array}{r} R_t^{Kgross} \frac{K_t}{m} + R_t^{hgross} \frac{h(\overline{\mathcal{L}} - \overline{\mathcal{L}_t^G} - m\mathcal{L}_t, ms_t)}{m} + (1-\delta_s)(S_t + s_t) - C_t \\ -(S_{t+1} + s_{t+1}) - \frac{K_{t+1}}{m} + \frac{R_t^{\mathcal{L}gross} \overline{\mathcal{L}_t^G}}{m} - \frac{\overline{\tau}_t \overline{\mathcal{L}}}{m} \end{array} \right\}$$

Program of the LG

$$Max_{\mathcal{L}_t^G,\tau_t} u[\overline{c_t}, \overline{h_t}, \mathcal{L}_t^G] + \gamma m U \left[f(\overline{X}_t) + \frac{\overline{R_t^{\mathcal{L}gross} \mathcal{L}_t^G}}{m} - \frac{\tau_t \overline{\mathcal{L}}}{m}, \overline{H_t}, \mathcal{L}_t^G \right]$$

under the constraint

$$\tau_t \overline{\mathcal{L}} - R_t^{\mathcal{L}gross} \mathcal{L}_t^G = 0$$

$\frac{\overline{R_t^{\mathcal{L}gross} \mathcal{L}_t^G}}{m}$ considered as frozen because of the citizenship assumption

Focs → the supply and demand rental prices

- Supply rental price from the capitalist with no tax externality because the tax base remains the same whatever the quantity of land leased to the LG

$$R_t^{\mathcal{L}gross} = R_t^{hgross} h_l'(t; \overline{\mathcal{L}_t^G})$$

- Demand rental price from the LG

$$R_t^{\mathcal{L}gross} = \frac{u'_{\mathcal{L}^G}(t; \overline{X}_t) + \gamma m U'_{\mathcal{L}^G}(t; \overline{X}_t)}{\gamma U'_C(t; \overline{X}_t)}$$

- At Walras-Nash, the two prices must be equal and the conditioning can be removed

Pareto decentralized by Walras-Nash

- Proposition 1. If a Walras-Nash mechanism exists, then it is Pareto Optimal in the case of a public land lease.

- The local community chooses the private land property tax rate, the Samuelson rule is fully implemented, and the quantity of public land corresponds to a specific social welfare weight of capitalists.

4.2 Public land property

- As for housing, ownership is generally preferred to tenancy as occupancy status. (City-hall homeownership preference)
- With land purchase/sale, the public land decision is intertemporal even if the LG deciders have a finite horizon
- The LG got an asset, land, with a market value. So it maximizes an intertemporal SWF function under budget constraints for each term. (no possibility to carry forward deficits)
- Each period, the LG can be either a net buyer or net seller. In the former case, a land tax; in the latter a land subsidy for private owners
- Looking at the stationary equilibrium means no more sale or purchase of land. The issue disappears.

Walras-Nash: perfect information about the sequence of choices over time

- Private agents already make a plan over the infinite horizon over the private variables accounting for a plan over public land and tax rates made by the LG
- Now it must be true also for the LG.
- Quite complex dynamics
- For the seek of realism and pedagogy, some short-cut where each agent (private and public) adopts the same stationary expectations for the next term regarding the marginal utility of income and land price.
- Sufficient to see the point

Dynamic tax externality on the capitalist side

- Because when considering a sale on a land plot the capitalist landlord accounts for the tax saving the next period.
- The land tax on private property is no more lump sum.

- A tax externality appears for the bid land price

$$P_t = \frac{R_t^{hgross} h_l'(t; \overline{\mathcal{L}_t^G}) - \overline{\tau}_t}{1-\beta}$$

- Not the case for the demand land price

$$P_t = \frac{1}{(1-\beta)} \frac{u'_{\mathcal{L}^G}(t; \overline{X}_t) + \gamma m U'_{\mathcal{L}^G}(t; \overline{X}_t)}{\gamma U'_C(t; \overline{X}_t)}$$

The efficiency result lost

- If the Walras-Nash equilibrium exists, it will entail a negative tax externality. The Walras-Nash allocation satisfies

$$u'_{\mathcal{L}^G}(t) + \gamma m U'_{\mathcal{L}^G}(t) = u'_h(t) h'_l(t) - \gamma U'_C(t) \tau_t$$

- Overprovision of public land in case of land purchase

- Underprovision of public land in case of land sale

5.1 Correcting the distorsion: The self-inflicting penalties, a dead end

- The Federal Gvt (FG) levies a tax/subsidy τ'on public land at the tax rate chosen by the LG and rebates to the LG

$$\tau_t(\overline{\mathcal{L}} - \mathcal{L}_t^G) - \tau_t'\mathcal{L}_t^G - P_t(\mathcal{L}_t^G - \mathcal{L}_{t-1}^G) + T = 0$$

- The FG levies a tax/subsidy on public land at the same rate as that on private property decided by the LG and compensates the LG through a grant

$$\tau_t(\overline{\mathcal{L}} - \mathcal{L}_t^G) - \tau_t\mathcal{L}_t^G - P_t(\mathcal{L}_t^G - \mathcal{L}_{t-1}^G) + T = 0$$

5.2 Correcting the distortion: A federal tax on LG public land

- A central authority levies a tax on public land τ^c considered as given by the LG with rebate to LG

$$\tau_t(\overline{\mathcal{L}} - \mathcal{L}_t^G) - \overline{\tau_t}^c \mathcal{L}_t^G - P_t(\mathcal{L}_t^G - \mathcal{L}_{t-1}^G) + T = 0$$

- The distortion is less than in the no-intervention case.

$$u'_{\mathcal{L}^G}(t) + \gamma m U'_{\mathcal{L}^G}(t) = u'_h(t)h'_l(t) + \gamma U'_C(t)(\overline{\tau_t}^c - \tau_t)$$

- No reason for the tax rate precisely adjusted to that chosen by the LG
- When the national and local tax rates are equal, efficiency
- If the federal tax rate is the average of LG land taxes, efficiency in average

Wrap-up

- The results pave the way for
  - Encouraging LG to lease land (but other considerations…)
  - Or taxing local public land if possible at the same rate as private land but it involves the FG
- The second option likely viewed as restricting the LG tax autonomy
- Unlikely to be popular among the LG deciders

To be done

- Are the distortions large? Need of a calibration. And a proof of existence at least for a specification and a range of parameters.
- Extension to the case where public good is a mix of land and buildings
- Introducing space as in the monocentric model and therefore commuting costs. Public land increases them.
- Public land can be artificialized (roads) or not (parks). Negative or positive externality for climate change on top of the public good character.
- Public land as a input.

Appendix Warning

- Warning: The fixed point depends on the transition beyond the current period. The proposition requires capitalist expectations regarding the path of the LG decisions to be the right one