# On the optimal allocation of responsibilities among national and subnational governments

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# What is the optimal allocation of responsibilities between three government levels?

How spillovers, heterogeneity of preferences, and economies of scale affect the decision to (de)centralize?

- Contributions
  - A fiscal-federalism model with an emphasis on the regional level
  - Regional governments are the most efficient when spillovers are significant
  - Preference heterogeneity creates an incentive to decentralize the provision of local public goods
  - Economies of scale create an efficiency gain from centralization
  - A unified theory encompassing the powers that influence decisions to (de)centralize

# Introduction

- Most countries have between 2-5 levels of governments
- E.g:
  - France: commune, department, region, state
  - Israel: local, (regional), state
- Oates Decentralization Theorem (1972): local governments should provide local public services
- 2nd Generation Fiscal Federalism introduces political economics

# Literature: Forces influencing (de)centralization

We summarize the literature into the following forces that influence the allocation of powers between sub-national tiers

| Decentralization | Force | Centralization | Reference |
|---|---|---|---|
| High | Information asymmetry | Low | Oates (1972) |
| Small | Spillovers | Significant | Besley and Coate (2003); Feidler and Staal (2012); Lockwood (2002); Lorz and Willmann (2005) |
| insignificant | Economies of scale | Significant | Oates (1972) |
| Small | Zoo effect: good scale | Large | Frère and Védrine (2024); Oates (1988) |
| Large | Size of local government | Small | Feidler and Staal (2012) |
| Substitute | Spill-in public goods | Complementary | Cheikbossian (2016); Gregor and Stastna (2012) |
| Averse public spending | Representation | Pro public spending | Besley and Coate (2003); Lorz and Willmann (2005) |
| Heterogenous | Residents' preferences variations between regions | Homogenous | Gregor and Stastna (2012)[*]; Lockwood (2002); Oates (1972) |

# The Model (i)

- Residents of each local government have different preferences
  - Mean and standard deviation at the jurisdiction level
- Local public goods can be provided by central/regional/local levels
- When an SNG provides $Q^*$ product units
  - Some residents receive more product units than their preferences
  - Others receive less
- Those that receive more product units
  - Attribute value only to the number of units that match their preferences
  - Pay for the number of units the government provides
- The aggregate utility of all residents is

$$U^x = \sum_{i=1}^{N^x} U_i^x = V^x \sum_{i=1}^{N^x} min\left(Q_i, Q^x\right) - N^x Q^x C^x, x \in \left(C, R, L\right)$$

$Q^x$ – number of product units SNG x provides
$N^x$ – number of residents
$V^x$ – value that residents attribute to public product
$C^x$ – cost of a product unit
$U^x$ – aggregate utility

# The Model (ii)

- The Decentralization Theorem states that each government maximizes its residents' aggregate surplus (Oates 1972).
  - The optimal provision of the local public good is the arithmetic mean of the product unit quantities across all residents
  - It is Pareto-efficient

Total welfare from public goods in jurisdiction x equals:
+ **N**umber of people * **Q**uantity * (**V**aluation of public goods - their **C**ost)
- Share of people * units which do not assign value to the public good

People in a given jurisdiction have variation in tastes (units requested)
MAD = mean absolute deviation

$$U^x = N^x Q^x (V^x - C^x) - \frac{1}{2} V^x N^x MAD, x \in (C, R, L)$$

*The aggregate surplus of providing local public goods under utility maximizing conditions*
  - *is proportional to the utility from the good*
  - *minus the loss of utility resulting from the relative dispersion of residents' preferences*

# Spillovers

- Residents of a local government may consume local public goods that an adjacent local government provides
  - If it better fits their preferences
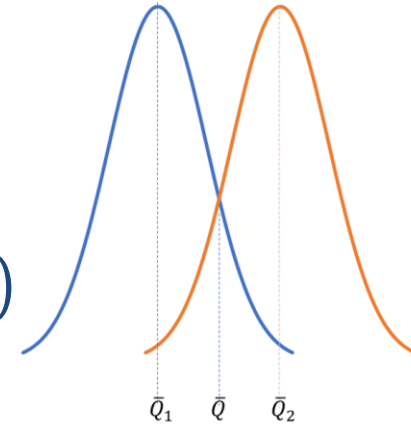  - Local competition
- *Locality where the residents "spill-in":*

$$U_1^L = N^L \bar{Q}_1 (V^L - C^L) - \frac{1}{2} V^L N^L MAD_1 + V^L (\bar{Q}_2 - \bar{Q}_1) N^L (1 - \Phi(\alpha))$$

- *Locality where the residents "spill-out":*

$$U_2^L = N^L \bar{Q}_2 (V^L - C^L) - \frac{1}{2} V^L N^L MAD_2 - C^L \bar{Q}_2 N^L (1 - \Phi(\alpha))$$

- The aggregate LG surplus

$$U^L = 2N^L \bar{Q} (V^L - C^L) - \frac{1}{2} V^L N^L (MAD_1 + MAD_2) + [\bar{Q}_2 (V^L - C^L) - V^L \bar{Q}_1] N^L (1 - \Phi(\alpha))$$

# Spillovers – Lemma 4

- The difference between aggregate surplus when the region and LGs provide

$$\Delta U^{L-R} = \frac{U^L}{N^L} - \frac{U^R}{N^L} =$$

$$= V\left(\frac{1}{2}(\bar{Q}_2 - \bar{Q}_1) - \frac{1}{2}(MAD_1 + MAD_2)\right) + (\bar{Q}_2(V - C) - V\bar{Q}_1)(1 - \Phi(\alpha))$$

- **Lemma 4: *Centralization is preferred when spillovers are sufficiently large and preferences are sufficiently similar***

  – When residents' preferences are significantly different, it is more beneficial for the local governments to provide the local public good, regardless of spillovers

  – The difference between residents' preferences moderates the relationship between spillover magnitude and the tier that is more beneficial in providing the local public good

# Economies of Scale

- The cost is a declining function of quantity: $c^C < c^R < c^L$

- The optimal allocation is maximizing the aggregate surplus

$$max(U^C, U^R, U^L)$$

$$\Delta U^{C-R} = \frac{U^C}{N^C} - \frac{U^R}{N^C} = Q^C(C^R - C^C) - \frac{1}{2}V\left(MAD^C - \sum_{j=1}^{n}\frac{MAD_j^R}{n}\right)$$

- Lemma 2: *it is more beneficial for an upper-tier to provide a local public good if the cost saving due to economies of scale is greater than the difference of the average resident preferences variability*

# Bi-modal Distribution

- A Region, and sometimes even an LG, may face bi-modal distribution

  – For simplicity we assume that each LG face uni-modal and the region faces bi-modal

$$\Delta U^{L-R} = \frac{U^L}{N^L} - \frac{U^R}{N^L} = V \left[ \overline{Q} - \overline{Q_1} - \frac{1}{2} (MAD_1 + MAD_2) \right]$$
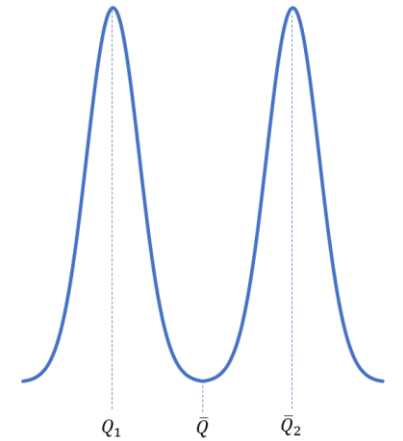
- Lemma 3:  *when residents' preferences exhibit bi-modal distribution, it is more beneficial to split them into two groups and provide each group with its average preference*

# Summary of findings: Additional Forces Influencing (de)Centralization

## We add the following forces to the model

| Decentralization | Force | Centralization | Comment |
|---|---|---|---|
| no economies of scale | Economies of scale | economies of scale exist | Corollary 1b |
| Cost saving < preference variability | Economies of scale vs. preference variability | Cost saving > preference variability | Lemma 2 |
| Significant | Spillovers / High preferences variability | Insignificant | Corollary 4b |
| Insignificant | Spillovers / Small Preferences variability | Significant | Corollary 4b |
| Large | Preferences variability between LGs | Small | Lemma 4 Corollary 4a |

# Allocation of Public Goods in Multi-Tier SNG

Grouping forces into 5 categories
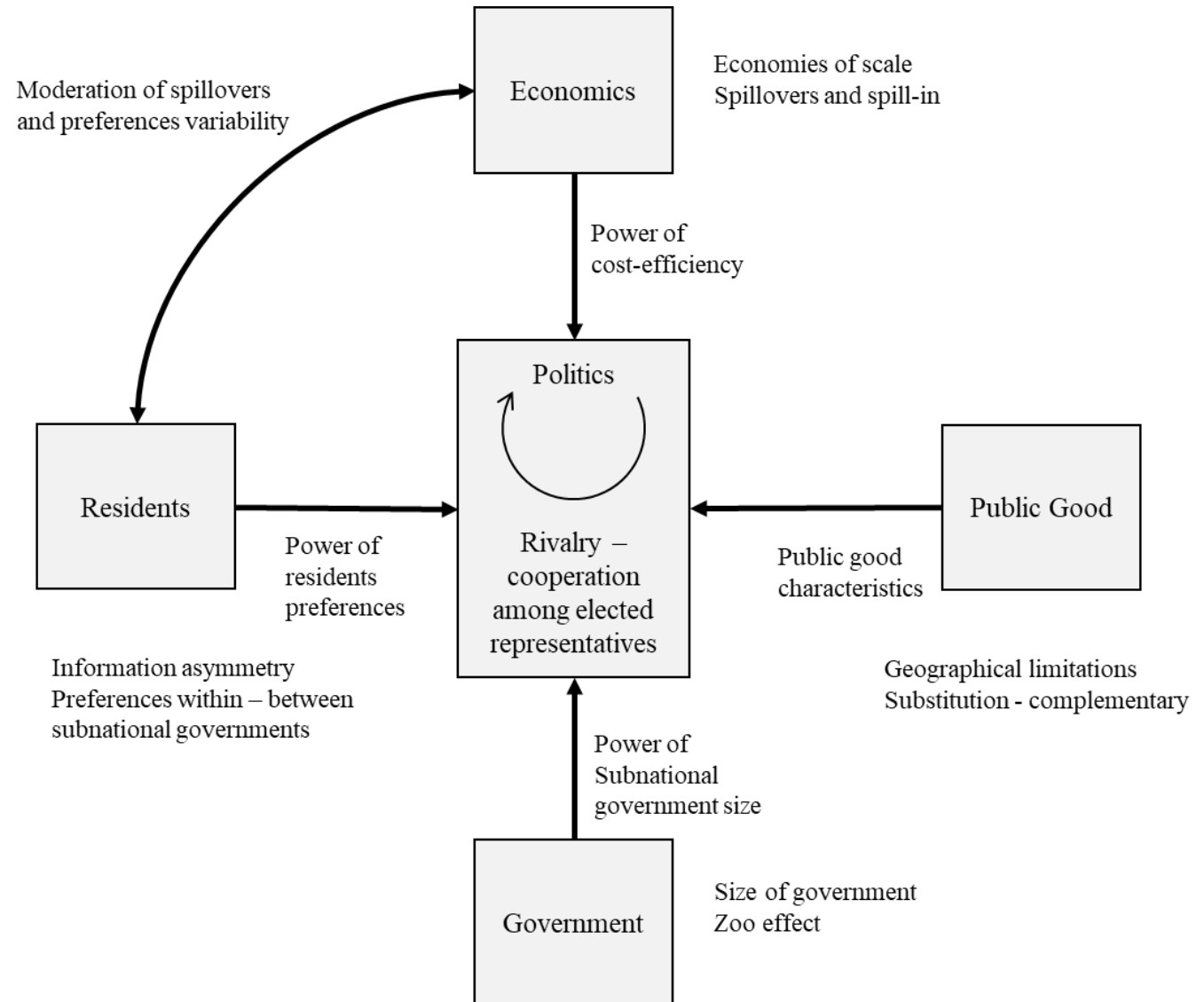
# Forces model application

We suggest a decision table to assist in the decision-making process

| Force | Magnitude | Local | Regional | Central |
|---|---|---|---|---|
| (2) | (3) | (4) | (5) | (6) |
| **Economies of scale** | large | -2 | +2 | +2 |
| **Spillovers** | Small | 0 | +1 | +1 |
| **preference heterogeneity** | large | +2 | 0 | -2 |
| **Sum** | | **0** | **3** | **1** |

# Conclusions

Introduce the regional tier into a fiscal federalism model:

- if spillovers and economies of scale are limited – local level more efficient
- If heterogeneity is dominant – local level more efficient
- If spillovers and/or economies of scale are dominant – the regional level is more efficient
- Central level is relevant only for inter-regional spillovers and pervasive economies of scale
- The disparity between residents' preferences moderates the relationship between the magnitude of spillovers and the optimal tier for providing the local public good

# Thanks

Questions? Suggestions?

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