Concept note:
A conceptual framework on regional public goods

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Motivation

• The financing and provision of regional public goods (RPGs) are integral to regional development
• RPGs may create market failures that lead to an inefficiently low level of supply (Sandler, 2006)

• Unlike other classes of public goods, RPGs generate benefits (harms) that do not fall under standard political jurisdiction
  • RPGs may thus face unique constraints (Arce M & Sandler, 2002; Estevadeordal et al., 2004)

• Four key questions:
  • What separates RPGs from other classes of public goods?
  • Which factors inhibit the provision of RPGs?
  • How can a more efficient level of provision be attained?
  • What is the optimal mechanism in supplying RPGs?
RPGs compared to other classes of public goods
The concept of a public good dates back to the work of Samuelson (1954) and Musgrave (1959).

Public goods possess two ‘classical’ properties:

- **Nonexcludability of non-payers**: Once a good is provided, its benefits can be consumed by both payers and nonpayers.
  - Preventing nonpayers from consuming is very costly.
  - Public goods create ‘externalities’, as even nonpayers can enjoy their benefits.

- **Nonrivalry of benefits**: Consumption by one party does not diminish the consumption opportunities of others.
Distinguishing RPGs

• An RPG can be considered a public good that provides nonexclusive and nonrival benefits to two or more nations in a well-defined region (Liu & Kahn, 2017; Sandler, 2006)

<table>
<thead>
<tr>
<th>Type of public good</th>
<th>Geographical scope of benefit spillovers</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>Within national borders</td>
<td>National park</td>
</tr>
<tr>
<td>Regional</td>
<td>Cross-border within a region</td>
<td>Limiting air pollution</td>
</tr>
<tr>
<td>Global</td>
<td>Worldwide</td>
<td>Climate change prevention</td>
</tr>
</tbody>
</table>

Source: Bruegel

• How should a ‘region’ be thought of?
  • Geographical, geological, geoclimatic, cultural, or political?

• What is the scope of a particular RPG? Which goods should be thought of as ‘regional’?
  • Example: National defense → national or regional public good?
## Providing RPGs compared to global public goods (GPGs)

<table>
<thead>
<tr>
<th>Factors facilitating RPG provision relative to GPGs</th>
<th>Factors constraining RPG provision relative to GPGs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPGs have fewer participants which may facilitate coordination</td>
<td>Traditional emphasis on supporting global and national, as opposed to regional, institutions to provide RPGs. Regional institutions may therefore be weaker in terms of reputation, experience and financial capacity (Sandler, 2006)</td>
</tr>
<tr>
<td>Increased spatial proximity and cultural homogeneity may limit uncertainty (Estevadeordal &amp; Goodman, 2017)</td>
<td>Some regions may lack a dominant nation and consequently leadership in delivering RPGs (Arce M &amp; Sandler, 2002)</td>
</tr>
<tr>
<td>RPGs may have more favorable characteristics than GPGs (e.g. Joint products or excludability) (Sandler, 2006)</td>
<td>Regional rivalries and competition may reduce the scope for intraregional collaboration</td>
</tr>
<tr>
<td></td>
<td>Barriers to provision, such as different languages or trade bloc membership, may be more severe for RPGs</td>
</tr>
</tbody>
</table>

Source: Bruegel based on the studies in the table
RPG provision: Incentives and constraints
Key properties of RPGs

- RPGs come in various forms with different properties
- Three properties shape the incentives to provide these goods:
  - The degree of nonexcludability of nonpayers
  - The degree of nonrivalry of benefits
  - The type of aggregation technology

- These properties have important implications for:
  - The nature of the provision problem
  - The supply prognosis without policy intervention
  - The effectiveness of various mechanisms in promoting RPG provision
Property #1: Nonexcludability of nonpayers

- Nonexcludability: Very costly to restrict consumption of benefits to nonpaying parties
- If an RPG is nonexcludable, the incentive for a single country to provide RPGs may be weak
  - The country may simply wait for its neighbors to supply the RPG and thereafter consume at zero cost
- This ‘free-riding’ behavior by most or all countries can lead to undersupply or no supply, as no country may be willing to provide the RPG (Desmarais-Tremblay, 2014)
  - Some form of policy intervention may therefore be necessary if the benefits of an RPG are nonexcludable
Property #2: Nonrivalry of benefits

• Nonrivalry: Marginal cost of extending consumption to another user is zero
  ➔ Setting P>0 is inefficient, since some consumers, who would benefit from the RPG, are denied access even though it costs nothing to include them
  ➔ Setting P=0 may be unfeasible in practice. A tax may be difficult to implement because:
    • Citizens’ valuations may be unknown
    • Imposing a tax on a transnational level may require a supranational authority

Price

P>0

P=MC= 0

Demand

Quantity

Source: Bruegel
A basic typology of RPGs

- Based on the two classic properties of RPGs, a basic typology can be developed.

- **Pure RPGs**: Nonrivalrous and nonexcludable
- **Pure private goods**: Rivalrous and excludable
- In between lies the class of impure RPGs. Two types:
  - **Regional club goods**: partially rival for members and excludable to nonmembers
  - **Regional joint products**: generate both private and purely public regional benefits

Source: Bruegel
## Examples of various classes of public goods

<table>
<thead>
<tr>
<th>Geographical scope</th>
<th>Pure public good</th>
<th>Club good</th>
<th>Joint product</th>
</tr>
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<tr>
<td>National</td>
<td>Street lighting</td>
<td>Cable television</td>
<td>Education</td>
</tr>
<tr>
<td>Regional</td>
<td>Watershed management</td>
<td>Free trade agreements</td>
<td>Peacekeeping</td>
</tr>
<tr>
<td>Global</td>
<td>Combatting global warming</td>
<td>Universal postal union</td>
<td>Some forms of foreign donor assistance</td>
</tr>
</tbody>
</table>

Source: Bruegel based on Arce M & Sandler (2002)
Property #3: Aggregation technology

- Aggregation technology: How individual contributions determine overall provision
- The classes of RPGs can be further subdivided based on this property

<table>
<thead>
<tr>
<th>Aggregation technology</th>
<th>Pure RPG</th>
<th>Regional club good</th>
<th>Regional joint product</th>
<th>Implication for RPG provision</th>
</tr>
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<tbody>
<tr>
<td><strong>Summation:</strong> Nations’ contributions are substitutable</td>
<td>Limiting air pollution</td>
<td>Transnational parks</td>
<td>Preservation of rain forests</td>
<td>Does not matter which country provides the RPG</td>
</tr>
<tr>
<td><strong>Weighted sum:</strong> Nations’ contributions have different impacts on the overall provision</td>
<td>Curbing the spread of HIV AIDS</td>
<td>Free trade agreements</td>
<td>Combating regional terrorism threats</td>
<td>The capacity and incentives to provide the RPG may be stronger for some countries</td>
</tr>
<tr>
<td><strong>Weakest-link:</strong> The smallest contribution determines the level of provision</td>
<td>Preventing the spread of pests</td>
<td>Airport network</td>
<td>Security intelligence</td>
<td>All countries must match a certain level of contribution</td>
</tr>
<tr>
<td><strong>Best shot:</strong> The largest contribution determines the level of provision</td>
<td>Curing a disease</td>
<td>Satellite launch site</td>
<td>Regional peacekeeping</td>
<td>Only the largest contribution matters – the remaining efforts are redundant</td>
</tr>
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RPGs: Optimal provision mechanism
Supply prospects and institutional arrangements per type of RPG

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<td>Treaty or multilateral institution</td>
<td>Club structure</td>
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<tr>
<td>Treaty, if information is available</td>
<td>Club structure</td>
<td>Treaty or multilateral institution</td>
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<tr>
<td>Regional collective, rich nation contribution, or partnership</td>
<td>Official intervention</td>
<td>Treaty or multilateral institution</td>
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<tr>
<td>Partnership</td>
<td>Club structure</td>
<td>Coordination needed</td>
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Source: Bruegel based on Arce M & Sandler (2002)

Supply prospects without policy intervention:

<table>
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<tr>
<th>Undersupply</th>
<th>Some undersupply</th>
<th>Undersupply or efficient</th>
<th>Efficient</th>
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Other considerations: Regional club goods and joint products

Regional club goods

• Though free-riding may be less of an issue for club goods, regional clubs may raise equity concerns if there are differences in the ability to pay across nations.

• As a result, inequitable exclusion may arise.

→ Scope to ensure that all countries can afford the ‘fees’ for club goods.

Regional joint products

• The supply prognosis will likely be more positive when the jointly provided private and public goods are complements.
Other considerations: Weakest-link and best shot

Weakest-link RPGs

- Provision will likely be efficient if the capacity and tastes of nations are similar.
- If some nations lack capacity, richer nations may contribute or directly intervene (Vicary & Sandler, 2002).
- If all nations lack capacity, supply may be inefficiently low without outside intervention.
  - Risk that outside assistance (e.g. by a donor country) leads to free-riding in the region though (Stålgren, 2000).

Best shot RPGs

- Supply is determined by the highest level of contribution.
  - Leadership by one nation is therefore required.
  - Coordination of efforts across countries to avoid duplication.
- Pooling of resources if the capacity of the 'largest' nation is insufficient (or seek outside assistance).

- For both best shot and weakest-link RPGs, the supply prognosis may be especially bleak if rich countries do not contribute.
  - Intervention by global or regional institutions may thereby become necessary.
Optimal provision mechanism: Subsidiarity

- **Subsidiarity principle**: An efficient level of supply is more likely if the region of spillover coincides with the political jurisdiction
  - If the spillover range > political jurisdiction → neglect of beneficiaries (undersupply)
  - If the spillover range < political jurisdiction → taxes imposed on parties not benefitting (oversupply)
  - If the spillover range = political jurisdiction → sum of marginal benefits of those affected equals marginal cost of provision (Sandler, 2006; Arce M & Sandler (2002))

→ Those who benefit from the good are in the best position to allocate it
→ Regional mechanisms should be used to provide RPGs
Evaluating the subsidiarity principle

Potential advantages of subsidiarity

Fosters allocative efficiency

Reduces transaction costs (by limiting the number of participants and lowering information asymmetry)

Lower enforcement costs (from repeated interactions)

Potential disadvantages of subsidiarity

Greater economies of scale and scope from provision by, for instance, a larger (e.g. global) multilateral institution

The required regional mechanism (e.g. institution) may not exist or lack capacity

Source: Bruegel based on Sandler (2006)

- The effectiveness of regional entities may also vary based on the type of aggregation technology
  - Weakest-link → Favors subsidiarity (if monitoring and coordination become easier)
  - Best shot → Detracts from subsidiarity (if resource pooling or capacity building is required)
- Ultimately, need to weigh the pros and cons of subsidiarity & consider the type of aggregation technology when choosing the provision mechanism
Endogenous aspects of RPG provision

- The optimal level of supply may depend on the degree of regional integration
  - Highly integrated regions may provide a higher level of RPGs because of:
    - More similar preferences
    - Greater opportunities for economies of scale and scope (Estevadeordal & Goodman, 2017)
- At the same time, greater provision of RPGs may foster increased regional integration
  - As members in a region become increasingly familiar with each other (e.g. through trade), transaction costs may decrease, potentially facilitating future collaboration in other areas (Arce M & Sandler, 2002)
- The endogenous relationship suggests the optimal level of RPGs may differ between regions due to various degrees of integration
- This may have important implications for the policy experience and possibly the applicability of Europe to the context of Asia and the Pacific
Conclusions

• RPGs face a number of idiosyncratic challenges compared to other classes of public goods

• The type of intervention (if any) required to attain an efficient level of provision should be tailored to the particular properties of the RPG

• The effectiveness of regional mechanisms in providing RPGs may depend on:
  • The aggregation technology
  • The potential for economies of scale/scope vs. the capacity of the existing regional mechanism

• The degree of regional integration matters when assessing the optimal level of RPG provision
References