

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

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)

Type of public good	Geographical scope of benefit spillovers	Example
National	Within national borders	National park
Regional	Cross-border within a region	Limiting air pollution
Global	Worldwide	Climate change prevention

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)

Factors <u>facilitating</u> RPG provision relative to GPGs	Factors <u>constraining</u> RPG provision relative to GPGs
RPGs have fewer participants which may facilitate coordination	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)
Increased spatial proximity and cultural homogeneity may limit uncertainty (Estevadeordal & Goodman, 2017)	Some regions may lack a dominant nation and consequently leadership in delivering RPGs (Arce M & Sandler, 2002)
RPGs may have more favorable characteristics than GPGs (e.g. Joint products or excludability) (Sandler, 2006)	Regional rivalries and competition may reduce the scope for intraregional collaboration
	Barriers to provision, such as different languages or trade bloc membership, may be more severe for RPGs

Source: Bruegel based on the studies in the table

RPG provision: Incentives and constraints

Key properties of RPGs

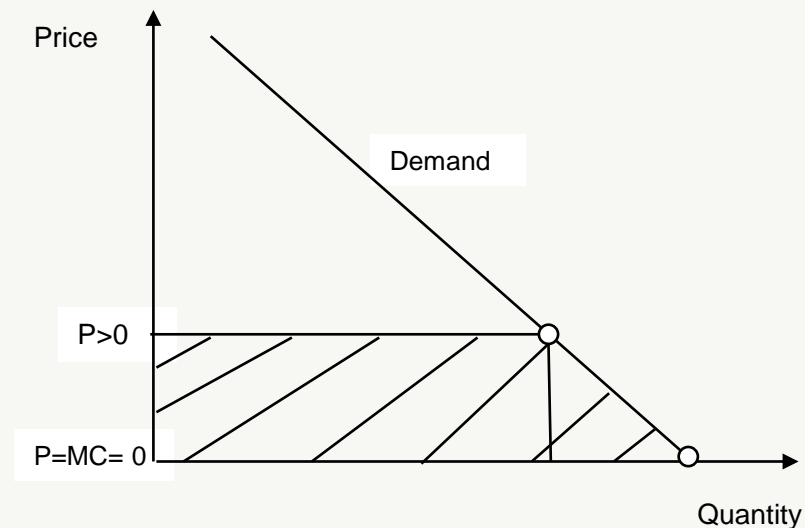
- RPGs come in various forms with different properties
- Three properties shape the incentives to provide these goods:
 - The degree of nonexcludability of nonpayers
 - The degree of nonrivalry of benefits
 - The type of aggregation technology
- These properties have important implications for:
 - The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

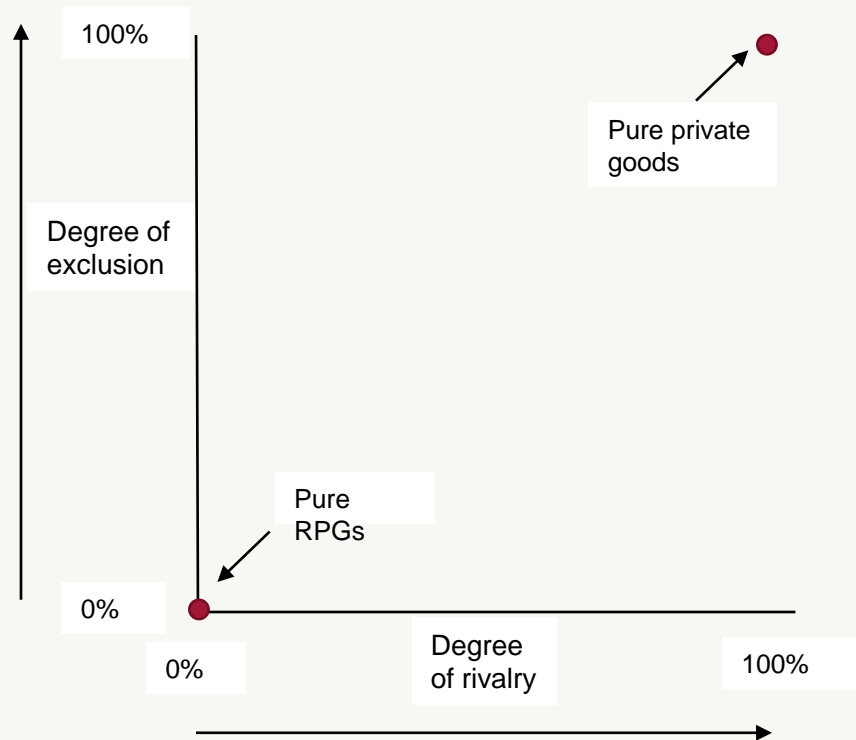
- Nonrivalry: Marginal cost of extending consumption to another user is zero
 - Setting $P > 0$ is inefficient, since some consumers, who would benefit from the RPG, are denied access even though it costs nothing to include them
 - Setting $P = 0$ may be unfeasible in practice. A tax may be difficult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



Source: Bruegel

A basic typology of RPGs

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



Source: Bruegel

- 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

Examples of various classes of public goods

Geographical scope	Pure public good	Club good	Joint product
National	Street lighting	Cable television	Education
Regional	Watershed management	Free trade agreements	Peacekeeping
Global	Combatting global warming	Universal postal union	Some forms of foreign donor assistance

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

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

Source: Bruegel based on Arce M & Sandler (2002) and Sandler (2004)

RPGs: Optimal provision mechanism

Supply prospects and institutional arrangements per type of RPG

	Pure RPG	Regional club good	Regional joint product
Summation: Nations' contributions are substitutable	Treaty or multilateral institution	Club structure	Treaty or multilateral institution
Weighted sum: Nations' contributions have different impacts on the overall provision	Treaty, if information is available	Club structure	Treaty or multilateral institution
Weakest-link: The smallest contribution determines the level of provision	Regional collective, rich nation contribution, or partnership	Official intervention	Treaty or multilateral institution
Best shot: The largest contribution determines the level of provision	Partnership	Club structure	Coordination needed

Source: Bruegel based on Arce M & Sandler (2002)

Supply prospects without policy intervention	Undersupply	Some undersupply	Undersupply or efficient	Efficient
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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 \rightarrow neglect of beneficiaries (undersupply)
 - If the spillover range $<$ political jurisdiction \rightarrow taxes imposed on parties not benefitting (oversupply)
 - If the spillover range $=$ political jurisdiction \rightarrow sum of marginal benefits of those affected equals marginal cost of provision (Sandler, 2006; Arce M & Sandler (2002))
- \rightarrow Those who benefit from the good are in the best position to allocate it
- \rightarrow Regional mechanisms should be used to provide RPGs

Evaluating the subsidiarity principle

Potential advantages of subsidiarity	Potential disadvantages of subsidiarity
Fosters allocative efficiency	Greater economies of scale and scope from provision by, for instance, a larger (e.g. global) multilateral institution
Reduces transaction costs (by limiting the number of participants and lowering information asymmetry)	The required regional mechanism (e.g. institution) may not exist or lack capacity
Lower enforcement costs (from repeated interactions)	

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

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