

Economics of Conflict, War, and Peace

Prof. Dr. Jurgen Brauer; Summer 2009
Chulalongkorn University; Bangkok, Thailand

Session 2.2 Intergenerational/long-term effects

Intergenerational/long-term effects

- Public goods
 - nonrival | nonexcludable
 - Examples: sunrise, sunset
 - Public goods can be privately produced (radio/TV program)
 - Private goods can be publicly produced (radio/TV sets)
 - Crucial issue: not production, but consumption aspects
- “An **intergenerational** pure public good provides benefits that are nonrival and nonexcludable within and among generations.”
 - Examples: (in just a moment)
- Focus here is not so much on war and peace as on conflict between generations

Intergenerational/long-term effects

- Nonsecurity-related examples
 - cure for cancer benefits people today and tomorrow;
 - biodiversity loss harms today's and tomorrow's generations
- Security-related examples
 - Ethnic violence today can carry over to the next generation
 - learning languages, ease of travel, and cultural understanding by today's generation will probably be passed on to the next generation

Intergenerational/long-term effects

- Note: the **innovation** in this chapter is to combine spatial (transnational) and temporal (transgenerational) aspects of public goods

	Intra-generational	Inter/trans-generational
Intra-national	the usual textbook case (e.g., national defense)	innovation
Inter/trans-national Regional Global	innovation	innovation

Intergenerational/long-term effects

- Caution:**
 - Not all results from transnational public goods analysis can be transferred to transgenerational problems:
 - International cooperation may bring more civilian, peaceful nuclear energy today – but leave more nuclear waste for tomorrow
 - The “natural sequencing of generations has profound implications” for the design of transgenerational public goods
 - Today’s generation may leave too much of a burden to tomorrow’s generation that tomorrow’s generation cannot defend against [the “first-mover” generation problem; sequential move games, as in chess, (table) tennis, etc.]

Intergenerational/long-term effects

- Purposes:**
 - (1) taxonomy of transnational and transgenerational goods and services
 - (2) implications for economic efficiencies of various combinations of transnational and transgenerational goods
 - (3) strategic aspects of intergenerational goods
 - (4) comments on institutional design aspects

Intergenerational/long-term effects

	Nonexclusion: low [Exclusion: high]	Nonexclusion: high [Exclusion: low]
Nonrivalry: high [Rivalry: low]	Club good (defense alliance)	Public good (national defense)
Nonrivalry: low [Rivalry: high]	Private good (body guard)	Common-resource pool good (emergency exit doors)

Prof. J. Brauer, Summer 2009
Chulalongkorn U., Bangkok

Economics of Conflict, War, and Peace
Session 2.2

7

Intergenerational/long-term effects

- **Pure public goods** yield benefits completely nonrival and nonexcludable
- **Impure public goods** yield benefits partially rival and/or partially excludable
- **Club goods** are a subclass of impure public goods
- **Joint products** are public goods with 2 or more output that vary in their degree of publicness

Prof. J. Brauer, Summer 2009
Chulalongkorn U., Bangkok

Economics of Conflict, War, and Peace
Session 2.2

8

Intergenerational/long-term effects

- Let's go through some examples
- Pure public goods

<ul style="list-style-type: none"> • Intragenerational 	<ul style="list-style-type: none"> • Regional 	<ul style="list-style-type: none"> • Forest fire suppression • Groundwater pollution cleanup • Animal disease control • Flood control
	<ul style="list-style-type: none"> • Global 	<ul style="list-style-type: none"> • Ocean pollution cleanup • Weather forecasts • Monitoring stations • World Court

Prof. J. Brauer, Summer 2009
Chulalongkorn U., Bangkok

Economics of Conflict, War, and Peace
Session 2.2

9

Intergenerational/long-term effects

■ Pure public goods

Intergenerational	Regional	<ul style="list-style-type: none">• Wetland preservation• Lake cleansing• Toxic waste cleanup• Lead emissions reduction
	Global	<ul style="list-style-type: none">• Ozone shield protection• Global warming prevention• Disease eradication• Knowledge creation

Intergenerational/long-term effects

■ Impure public goods (partially rival/excludable)

Intragenerational	Regional	<ul style="list-style-type: none">• Waterways• Rivers• Highways• Local parks
	Global	<ul style="list-style-type: none">• Electromagnetic spectrum allocation• Satellite transmissions• Postal service• Disease control

Intergenerational/long-term effects

■ Impure public goods (partially rival/excludable)

Intergenerational	Regional	<ul style="list-style-type: none">• Acid rain reduction• Fisheries protection• Hunting grounds protection• VOC emissions reduction
	Global	<ul style="list-style-type: none">• Overuse of antibiotics• Ocean fisheries• Antarctica protection• Revolution making ←

Intergenerational/long-term effects

■ Club goods

Intragenerational	Regional	<ul style="list-style-type: none">• Common markets• Crisis management forces ←• Electric grid• Information networks
	Global	<ul style="list-style-type: none">• Canals• Air corridors• Internet• Shipping lanes

Intergenerational/long-term effects

■ Club goods

Intergenerational	Regional	<ul style="list-style-type: none">• National parks• Irrigation systems• Lakes• Cities
	Global	<ul style="list-style-type: none">• Transnational parks• Geostationary orbits• Polar orbits• Barrier reefs

Intergenerational/long-term effects

■ Joint product

Intragenerational	Regional	<ul style="list-style-type: none">• Peacekeeping ←• Military forces ←• Medical aid• Technical assistance
	Global	<ul style="list-style-type: none">• Foreign aid• Disaster relief ←• Drug interdiction ←

Intergenerational/long-term effects

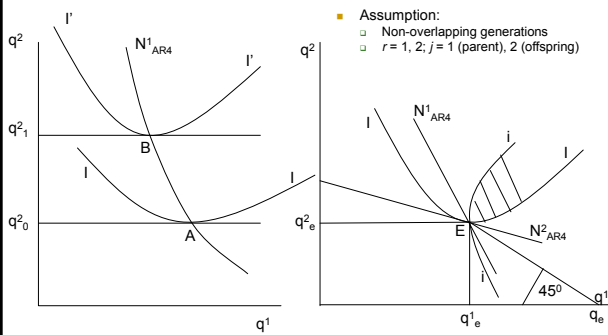
Joint product

- | | | |
|-------------------|----------|---|
| Intergenerational | Regional | <ul style="list-style-type: none"> • Peacekeeping ← • Flood control • North Atlantic Treaty Organization ← • Cultural norms |
| | Global | <ul style="list-style-type: none"> • Tropical forest preservation • Space colonies • United Nations • Poverty alleviation |

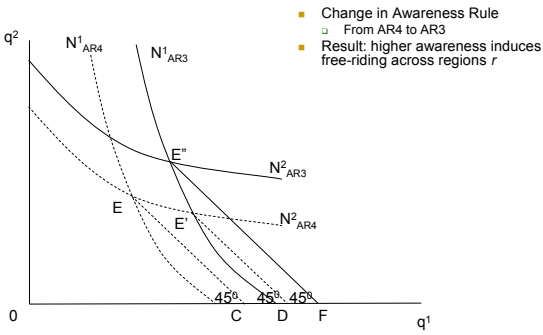
Intergenerational/long-term effects

- Optimality requires equating **marginal costs** of provision with **marginal benefits** across all regions r (space) and all generations j (time)
- Awareness Rule 1: $MC = \sum MB_{jr}$
 - Across all regions and generations (enlightened)
- Awareness Rule 2: $MC = \sum MB_r$
 - Across all regions but within a generation
- Awareness Rule 3: $MC = \sum MB_j$
 - Across all generations within a region
- Awareness Rule 4: $MC = \sum MB$
 - Only within a region and within a generation (myopic)

Intergenerational/long-term effects

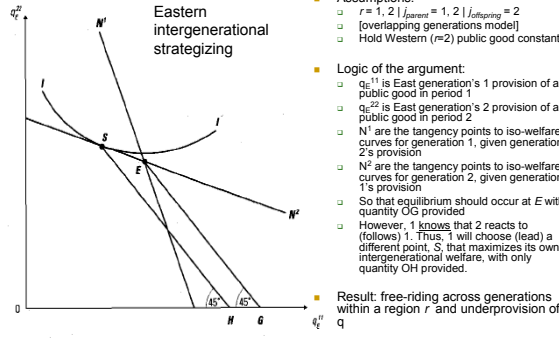


Intergenerational/long-term effects



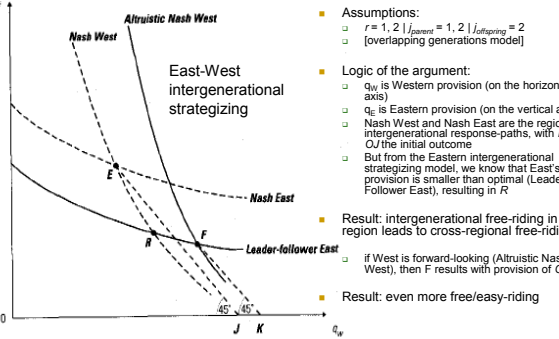
- Change in Awareness Rule
 - From AR4 to AR3
- Result: higher awareness induces free-riding across regions r

Intergenerational/long-term effects



- Assumptions:
 - $r = 1, 2$ $I_{Western} = 1, 2$ $I_{Following} = 2$
 - [overlapping generations model]
 - Hold Western ($r=2$) public good constant
- Logic of the argument:
 - q^1 is East generation's 1 provision of a public good in period 1
 - q^2 is East generation's 2 provision of a public good in period 2
 - N^1 are the tangency points to iso-welfare curves for generation 1, given generation 2's provision
 - N^2 are the tangency points to iso-welfare curves for generation 2, given generation 1's provision
 - So that equilibrium should occur at E with quantity OG provided
 - However, 1 knows that 2 reacts to (follows) 1. Thus, 1 will choose (lead) a different point, S , that maximizes its own intergenerational welfare, with only quantity OH provided.
- Result: free-riding across generations within a region r and underprovision of q

Intergenerational/long-term effects



- Assumptions:
 - $r = 1, 2$ $I_{Western} = 1, 2$ $I_{Following} = 2$
 - [overlapping generations model]
- Logic of the argument:
 - q^1 is Western provision (on the horizontal axis)
 - q^2 is Eastern provision (on the vertical axis)
 - $Nash\ West$ and $Nash\ East$ are the regions' intergenerational response-paths, with E at OJ the initial outcome
 - But from the Eastern intergenerational strategizing model, we know that East's provision is smaller than optimal (Leader-Follower East), resulting in R
- Result: intergenerational free-riding in one region leads to cross-regional free-riding
 - if West is forward-looking (Altruistic Nash West), then F results with provision of OK
- Result: even more free/easy-riding

Intergenerational/long-term effects

- Joint products:
 - A public good, g , yields private (national, current generation) benefits, x , and public (regional/global and intergenerational) benefits, z
 - The decisionmakers are assumed to concentrate on benefits to the current generation in their own region (myopic)
 - In essence, the current generation/region produces a good with positive externalities and fails to account for the positive effects generated for other regions and/or future generations
 - Consequently, the good is undersupplied (as in Brück's model)
 - There are two sources of suboptimality: (1) intergenerational undersupply; (2) interregional/global undersupply
 - In principle, this can be measured as the share of benefits received by the current generation in a region relative to the total benefits to all generations in all regions
 - The greater this share (in the extreme, $1/1=1$), the more likely it is that the good will be provided
 - One consequence: if current generations create supranational institutions to provide interregional public goods with future negative externalities (e.g., nuclear energy and nuclear waste), resource allocation will become worse as more of a problem is imposed on future generations
 - So when external effects concern joint products, regions, and generations (3 aspects) addressing just 1 or 2 of these may worsen resource allocation relative to no agreement whatsoever

Intergenerational/long-term effects

- Intergenerational clubs
 - One approach to deal with the problems is to form intergenerational clubs where one generation's assets are "sold" to the next generation to generate "pension" benefits for the current generation
 - This will induce the current generation to properly look after public goods assets
 - But this relies on a feasible exclusion mechanism

Intergenerational/long-term effects

- Design considerations
 - (1) institutions need to include overlapping generations among the decisionmakers; thus, no generation can make deals at the expense of other generations (eliminates current generations' first-mover advantage)
 - (2) institutions need to be long-lived to help maintain an intergenerational perspective
 - (3) institutions must supply the current generation with sufficient benefits to motivate it to act
 - (4) the more benefits spill over to the current generation (need for research and education), the less need there is to formalize the institutional arrangements
 - (5) "loosely" structured institutions are preferred as they economize on transaction costs relative to benefits
 - "Loose": no need for enforcement apparatus, decisions are unanimous, meetings infrequent, and autonomy preserved
