

Workshop on Globalization and Public Policy Vienna IHS and Cologne Center for Public Economics

Preventing
Public Input
Competition

S. Bucovetsky

title

Preventing Public Input Competition

Introduction

the model

Sam Bucovetsky

efficiency

Arts/Economics

simultaneous
moves

York University

sequential
moves

Toronto ON Canada

negotiation

September 29 2007

why?

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

subject : the “other side” of tax competition ;

the race to the top in public investment, instead of the race to the bottom in taxes

noted by Martin and Rogers (1995), Keen and Marchand (1997), Boarnet (1998) [and others]

questions

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

here,

what — other than a benign central government — might weaken tendencies for over–investment by competing regional governments?

- 1 less aggressive behaviour by regional governments?
- 2 first–mover advantage?
- 3 negotiation by governments?

increasing returns

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

the model :

simplified version of the one in Bucovetsky (2005)
increasing returns without Baldwin or Krugman

with decreasing returns, over–investment is still a potential
problem ; there may be too much investment in each region

but with increasing returns, there may be too many regions
undertaking public investment ; this asymmetry may make
traditional (Pigouvian) remedies more difficult to implement

model formulation

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

the gross value of output produced in region i is

$$F(G_i, M_i) = G_i^g M_i^a \quad (1)$$

where

G_i : public investment in region i

M_i : level of the mobile factor employed in region i

$$0 < a < 1 \quad ; \quad 0 < g < 1 \quad ; \quad a + g > 1 \quad (2)$$

so : increasing returns in two inputs together

measures of scale economies

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

define

$$b_X \equiv g + a2^{a-1} - 1 \quad (3)$$

$$b_B \equiv 2g + (2 - g)a - 2 \quad (4)$$

both measures are negative if $a + g \leq 1$, and are positive only if scale economies are “strong”

and $b_B > 0 \rightarrow b_X > 0$

the mobile factor

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

there are two regions, ex ante identical
each endowed with the same quantity $\frac{\bar{M}}{2}$ of the mobile factor
perfect factor mobility implies that region i gets a share s_i of
the mobile factor in equilibrium, where

$$s_i \equiv \frac{G_i^\gamma}{G_1^\gamma + G_2^\gamma} \quad (5)$$

where $\gamma \equiv \frac{g}{1-a} > 1$

so increasing returns \rightarrow : if region i has more than half the
public investment, its share of the mobile factor is greater
than its share of public investment

boosters and xenophobes

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

if w_i is the return to the mobile factor
and if region i has the greater public investment, then
factor returns of $w_i(M_i - \frac{\bar{M}}{2}) = w_i(s_i - \frac{1}{2})\bar{M}$ are going to
owners of units of the mobile factor which are imported from
the other region

“xenophobes” : governments which regard these factor
payments as a cost, to be deducted from the gross value of
output produced in the region

“boosters” : governments which consider these payments
as part of the income earned in the region, not a payment to
outsiders

boosters and xenophobes

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

in Bucovetsky (2005) governments were assumed to be boosters : [e.g. : the mobile factor is labour, and workers move to the new region and become full citizens]

here [for the most part] governments are assumed to be xenophobes : [e.g. the mobile factor is an intermediate good, some of which is imported from the other region]

cf Michel, Pestieau and Vidal (1998), Richter (2004), Sinn (2005), Weichenreider and Busch (2007)

not surprisingly, with xenophobes over–investment in public infrastructure is less of a problem

the efficient investment pattern

assume : unit cost of investment is c , so that the net value of output produced in the two regions is

$$F(G_1, M_1) + F(G_2, M_2) - c(G_1 + G_2), \quad M_1 + M_2 = \bar{M}$$

as long as $a + g > 1$, total value of output minus total cost of investment is maximized by concentrating public investment in one region

so the efficient investment pattern is $(G_1, G_2) = (G^*, 0)$, or $(0, G^*)$, where

$$F_G(G^*, \bar{M}) = c$$

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

the payoff to [xenophobic] region 2

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

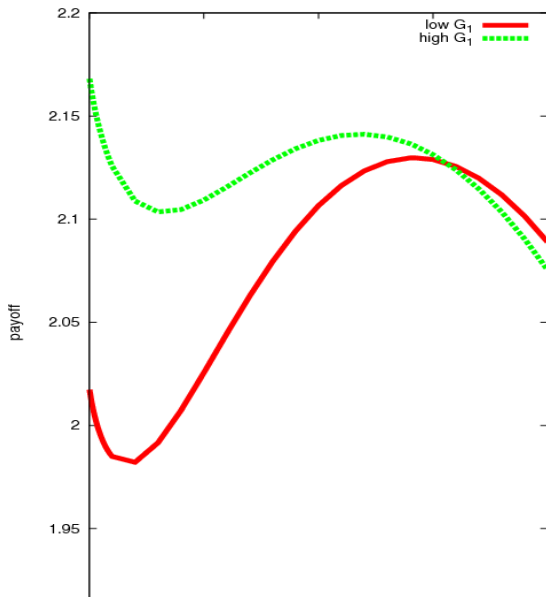
the model

efficiency

simultaneous
moves

sequential
moves

negotiation



the simultaneous–move game

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

if scale economies are small [$b_X \leq 0$] there is a symmetric equilibrium to the simultaneous–move game, in which

$$G_1 = G_2 = G^E$$

where

$$F_G(G^E, \frac{\bar{M}}{2}) = c$$

too much diversification

the simultaneous–move game

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

if scale economies are large, then there exist asymmetric Nash equilibria to the simultaneous–move game, in which $G_1 = G^S$, $G_2 = 0$ or $G_1 = 0$, $G_2 = G^S$ where

$$\left(1 - \frac{a}{2}\right)F_G(G^S, \bar{M}) = c$$

since $G^S < G^*$, there is too little public investment in this equilibrium, since the high–investment region’s government neglects the positive externality its investment creates for suppliers of the imported mobile factor

if scale economies are “moderate” (so that b_X is negative, but close to zero), then both types of outcome [symmetric or asymmetric] will be Nash equilibria to the simultaneous–move game

the simultaneous–move game

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

comparison with a world of boosters :

when both governments are boosters, a symmetric equilibrium is more likely : it occurs whenever $b_B \leq 0$

so aggressive behaviour by governments is more likely to lead to wasteful duplication of public investment

when scale economies are high [$b_B > 0$], there may be an asymmetric equilibrium which is efficient [$G_1 = G^*$, $G_2 = 0$ or vice versa]

but “more likely”, there is no Nash equilibrium at all in pure strategies when governments are boosters and scale economies are large

better to free ride on public investment?

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

with xenophobic governments, it may be better to be the low–investment region

enabling suppliers of the mobile factor to free ride on the other region's investment

Lemma 7 : In an asymmetric equilibrium, in which $G_1 = G^S$ and $G_2 = 0$, region 2 does better than region 1 if and only if $b_B > 0$ [scale economies are high]

this incentive to let the other region pay for public investment cannot arise if both regions' governments are boosters

sequential moves

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

if scale economies are small but positive [and if both governments are xenophobic], the Nash equilibrium may still be symmetric, $G_1 = G_2 = G^E$, even when regions choose investment levels sequentially

if scale economies are large [$b_B > 0$] the first mover chooses a lower level of public investment than the second mover

instead of over–investment to attract mobile resources, there is strategic delay, to force the other region to bear the cost of public investment

but

Proposition 4 : the sequential–move Nash equilibrium (weakly) Pareto dominates the symmetric Nash equilibrium to the simultaneous–move game

invest, then negotiate

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

assumption on timing :

- 1 region 1 chooses an initial investment level G_1^0
- 2 the two regions negotiate
- 3 if negotiations fail, then regions choose (further) investment simultaneously and non-cooperatively

so the disagreement outcome is the simultaneous-move Nash equilibrium, modified by the fact that region 1 already has G_1^0 in place

selection rule : if there are multiple equilibria to stage 3, the equilibrium selected is the one with the highest level of G_1

efficient negotiation

Preventing
Public Input
Competition

S. Bucovetsky

title

Introduction

the model

efficiency

simultaneous
moves

sequential
moves

negotiation

assumption : Nash bargaining (with equal weights)

the outcome of bargaining is — no surprise — the efficient one : $G_1 = G^*$, $G_2 = 0$

xenophobic region 1 has no incentive to over–invest strategically to improve its bargaining position

the convention that $G_1 \geq G_2$ in any post–disagreement equilibrium means that region 1 cannot under–invest strategically when scale economies are large, to force region 2 to pay more after negotiation

transfers go the “wrong” way : as long as $a + g > 1$, region 2 pays a transfer to region 1

although region 2’s residents will still have a higher equilibrium payoff when $b_B > 0$