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## On the effects of factor mobility on local infrastructure policy and rent-seeking

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Local Infrastructure Policy and Rent-Seeking**

Oliver Lorz

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# **On the Effects of Factor Mobility on Local Infrastructure Policy and Rent-Seeking**

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January 1998

**Abstract:** This paper deals with the influence of factor mobility on local infrastructure policy and rent-seeking activities of local interest groups. It employs a model where households differ with respect to their endowment with the immobile factor land. Local governments decide about the level of productive infrastructure in their jurisdiction. According to their land endowment, different households benefit to a different degree from the infrastructure. This redistribution effect of local infrastructure gives households an incentive for rent-seeking: Land-abundant households seek to influence their government to increase the level of infrastructure whereas land-poor households seek to influence their government to reduce the infrastructure level. As this paper shows, factor mobility and fiscal competition between local governments lead to increasing rent-seeking expenditures for a broad class of cases.

**Keywords:** Factor Mobility, Fiscal Competition, Rent-Seeking

**JEL-Classification:** D 72, H 41, H 72

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## 1. Introduction

In this paper a political economy model is set up which deals with the influence of factor mobility on local infrastructure policy and rent-seeking of interest groups. Infrastructure is used in the production process as a local public intermediate good in this model. For example, think of local transport and communication facilities or public administration services. This kind of infrastructure raises the productivity of private factors in the jurisdiction where it is supplied. According to their endowment with the immobile factor land, different households benefit to a different degree from the local infrastructure. Households owning a large amount of land derive large benefits from an increasing infrastructure level compared to households owning only a small amount of land or no land at all in the jurisdiction. The households have an incentive to influence policy by rent-seeking activities of local interest groups. Land-abundant households seek to influence the local government in favour of a higher level of infrastructure; land-poor households seek to influence policy in the opposite direction.

The existing literature on non-co-operative infrastructure policy with interregional factor mobility can be basically divided into two groups of models: In the first group infrastructure policy is used to influence the price of the mobile factor capital strategically (see Devereux, 1987, or Anwar, 1992). A capital-exporting jurisdiction raises its supplied quantity of infrastructure above the co-operative level to increase the price of capital. A capital-importing jurisdiction instead chooses an infrastructure level below the co-operative level. Such a strategic infrastructure policy is inefficient from a global point of view: The equilibrium infrastructure policy deviates from the Pareto-optimum. Rauscher (1993) introduces rent-seeking in this setting. He shows that the inefficiency caused by strategic infrastructure policy might be reduced by rent-seeking which leads to a political bias in favour of certain interest groups. However, Rauscher (1993) does not derive the rent-seeking equilibrium in his model.

The second group of models investigates whether tax competition between jurisdictions leads to an underprovision of local infrastructure. As Zodrow, Mieszkowski (1986) or Gerber, Hewitt (1987) have shown, this underprovision may occur, if the infrastructure has to be financed entirely with a source-based tax on the mobile factor capital.<sup>1</sup> However, if lump-sum taxes can be raised, then the equilibrium level of infrastructure will remain unaffected by factor mobility on the first best level. The tax-competition models of local infrastructure policy do not explicitly consider rent-seeking of interest groups.

In contrast to these models, this paper focuses on the distribution effects of infrastructure policy in an open jurisdiction. It therefore neglects asymmetries between the countries. It also

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<sup>1</sup> According to Sinn (1997), this underprovision result does not hold for a certain class of production functions.

assumes non-distortionary financing of the infrastructure. The equilibrium infrastructure levels and the equilibrium rent-seeking expenditures are derived in this framework for a closed jurisdiction and for a small open jurisdiction with perfect factor mobility.<sup>2</sup> A comparison of these two equilibria shows the influence of factor mobility on rent-seeking and on the level of infrastructure. The structure of the paper is as follows: In section 2 the model is set up and the equilibrium is derived for a closed jurisdiction. In section 3 the closed jurisdiction equilibrium is compared to the open jurisdiction equilibrium for the case of symmetric rent-seeking. Section 4 treats the case of asymmetric rent-seeking and section 5 concludes.

## 2. Equilibrium in a Closed Jurisdiction

Suppose three factors are necessary to produce aggregate output  $Y$ : two private factors, land  $L$  and capital  $K$ , and the public factor infrastructure  $G$ . The private households inelastically supply land and capital whereas the government decides about the supplied quantity of infrastructure. Infrastructure is assumed to be a pure public intermediate good of the factor augmenting type (see Hillman, 1978, or McMillan, 1979). The aggregate production function has constant returns to scale with respect to both private factors  $L$  and  $K$  and increasing returns to scale with respect to all three factors  $L$ ,  $K$  and  $G$ . For simplicity, the paper employs a Cobb-Douglas specification of the production function ( $0 < \alpha, \beta < 1$ ):

$$(1) \quad Y = L^\alpha K^{1-\alpha} G^\beta.$$

According to their land endowment, the total number of households  $n$  can be divided up into two groups - one group of land-abundant households endowed with  $\lambda_h \equiv L_h/n_h$  units of land per head and the other group with land endowment  $\lambda_l \equiv L_l/n_l$  per head ( $\lambda_h > \lambda_l$ ). Capital is distributed equally between the  $n$  households. Gross income of each private household is made up of land rent and capital income. The product and the factor markets are assumed to be perfectly competitive. With  $Y$  taken as numeraire, this assumption implies factor prices equal to the marginal product of the factors. The following equations give the marginal product of both private factors ( $k \equiv K/L$ ):

$$(2) \quad \frac{dY}{dK} = [1-\alpha]k^{-\alpha}G^\beta,$$

$$(3) \quad \frac{dY}{dL} = \alpha k^{1-\alpha}G^\beta.$$

Public infrastructure raises the marginal product of capital as well as the marginal product of land. Therefore both the capital income and the land rent rise with an increasing level of

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<sup>2</sup> Households are assumed to be immobile.

infrastructure. To finance the costs of providing infrastructure, all households have to pay an equal lump-sum tax. Unit costs of providing infrastructure are assumed to be constant and are set equal to one. The net income of a household  $j$  ( $j=h,l$ ) is given by the following equation:

$$(4) \quad y_j = k^{1-\alpha} G^\beta \left\{ \lambda + \alpha [\lambda_j - \lambda] \right\} - \frac{G}{n}.$$

The term  $\lambda \equiv L/n$  denotes average land endowment per head.

An increasing level of public infrastructure affects individual net income according to the following equation ( $\varepsilon_j \equiv \lambda + \alpha [\lambda_j - \lambda]$ ):

$$(5) \quad \frac{dy_j}{dG} = \beta G^{\beta-1} k^{1-\alpha} \varepsilon_j - \frac{1}{n}.$$

According to (5) a land-abundant household benefits more from an increasing infrastructure level than a land-poor household. Both household types have to bear the same tax burden to finance public infrastructure but a land-abundant household receives a larger share of the benefits from an increasing land rent compared to a land-poor household. Consequently, a land-abundant household prefers a higher level of infrastructure than a land-poor household.<sup>3</sup>

The conflict concerning the desired level of infrastructure may give both groups of household an incentive to influence policy through rent-seeking activities. To model the political influence of rent-seeking, a simple two-stage game is set up in this paper: In the first stage, the interest groups exert rent-seeking pressure on the local government. In the second stage, the local government chooses the level of infrastructure. The government maximises the weighted sum of the net incomes of both household groups.<sup>4</sup> The respective weights  $\omega_h$  and  $\omega_l$  depend on the rent-seeking activities in the first stage of the game. To solve for the subgame perfect equilibrium of the game, the solution of the second stage of the game is derived first. Equation (6) represents the objective function of the government in the second stage:

$$(6) \quad W = \omega_l n_l y_l + \omega_h n_h y_h.$$

This gives the following first order condition:

$$(7) \quad \beta G^{\beta-1} k^{1-\alpha} \left\{ \lambda + \alpha [\lambda_h - \lambda_l] \right\} \left[ \omega_h' - n_h' \right] - \frac{1}{n} = 0.$$

<sup>3</sup> This result can be derived by setting (5) equal to zero for both household groups  $h$  and  $l$ .

<sup>4</sup> Coughlin, Mueller and Murell (1990a, 1990b) provide a theoretical foundation for assuming such an objective function of the government.

The term  $\omega'_h$  denotes the relative weight of the group of land-abundant households in the political objective function ( $\omega'_h \equiv \frac{\omega_h n_h}{\omega_l n_l + \omega_h n_h}$ ) whereas  $n'_h$  denotes the relative size of this household group ( $n'_h \equiv \frac{n_h}{n_l + n_h}$ ). If all households, whether land-abundant or land-poor, have the same absolute weight in the political objective function, then  $\omega'_h$  will equal  $n'_h$  and the local government will have no incentive to redistribute income between both household groups. The marginal productivity of public infrastructure will equal the marginal costs of one in this case. If the absolute weight of the land-abundant households in the political objective function exceeds the absolute weight of the land-poor households, then  $\omega'_h$  will exceed  $n'_h$  and the equilibrium level of infrastructure will be higher than in the case without redistribution. Contrary, for  $\omega'_h < n'_h$  the equilibrium infrastructure level will be lower than without redistribution.

Rearranging (7) gives the explicit solution for the equilibrium level of infrastructure ( $\mu \equiv \lambda + \alpha[\lambda_h - \lambda_l][\omega'_h - n'_h]$ ):

$$(8) \quad G = [\mu\beta n]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}}.$$

Equation (8) shows how the political weights of both interest groups influence the equilibrium level of infrastructure in the second stage of the game: The infrastructure level rises with an increasing relative weight  $\omega'_h$  of the land-abundant households and declines with a decreasing relative weight of these households:

$$(9) \quad \frac{dG}{d\omega'_h} = \frac{\alpha[\lambda_h - \lambda_l]}{1-\beta} \mu^{\frac{\beta}{1-\beta}} [\beta n]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} > 0.$$

With this outcome of the second stage of the game, the solution of the first stage can now be derived: There are two interest groups in the jurisdiction, one group represents the land-abundant households, the other group represents the land-poor households. All households are assumed to be members of their respective interest group. Each interest group  $j$  can raise the political weight  $\omega_j$  by rent-seeking activities. The weight  $\omega_j$  is assumed to be a differentiable function of the rent-seeking expenditures  $r_j$  of interest group  $j$ :  $\omega_j = \omega_j(r_j)$ , with  $\omega'_j(r_j) > 0$  and  $\omega''_j(r_j) < 0$ . The net income of both household types is affected by the level of infrastructure according to the following equations:<sup>5</sup>

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<sup>5</sup> These equations are derived from inserting (7) into (5).



$$(10) \quad \frac{dy_h}{dG} = \frac{\alpha[\lambda_h - \lambda_l]\omega_l^r}{n\mu},$$

$$(11) \quad \frac{dy_l}{dG} = -\frac{\alpha[\lambda_h - \lambda_l]\omega_h^r}{n\mu}.$$

As long as the welfare weights of both household groups are strictly positive, the land-abundant households benefit from an increasing infrastructure level whereas the land-poor households benefit from a decreasing level of infrastructure. The group of land abundant households can raise the relative weight  $\omega_h^r$  by increasing its rent-seeking expenditures. According to (9) this leads to an increasing infrastructure level and - according to (10) - to an increasing income of the land-abundant households. The group of land poor households can lower  $\omega_h^r$  with rent seeking and therefore lower the equilibrium infrastructure level. The net income of land-poor households then rises according to (11). The interest groups try to maximise the net factor income of their representative household corrected for the household's share of the rent-seeking expenditures. It is assumed that the rent-seeking expenditures of interest group  $j$  are shared equally between the  $n_j$  members of this group. The following first order condition therefore has to be satisfied for  $j=h,l$ , with  $\frac{dG}{d\omega_h^r}$ ,  $\frac{dy_h}{dG}$  and  $\frac{dy_l}{dG}$  given by (9), (10) and (11) respectively:

$$(12) \quad \frac{dy_j}{dG} \frac{dG}{d\omega_h^r} \frac{d\omega_h^r}{d\omega_j} \omega_j^r = \frac{1}{n_j}.$$

Inserting (9) and (10) or (9) and (11) in (12) gives the following two first order conditions for the equilibrium rent-seeking expenditures, with  $\hat{\omega}_j \equiv \omega_j^r/\omega_j$ :<sup>6</sup>

$$(13) \quad \frac{\alpha^2[\lambda_h - \lambda_l]^2 [n\beta]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} \mu^{\frac{2\beta-1}{1-\beta}}}{1-\beta} \omega_h^r [\omega_l^r]^2 \hat{\omega}_h = \frac{1}{n_h^r},$$

$$(14) \quad \frac{\alpha^2[\lambda_h - \lambda_l]^2 [n\beta]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} \mu^{\frac{2\beta-1}{1-\beta}}}{1-\beta} [\omega_h^r]^2 \omega_l^r \hat{\omega}_l = \frac{1}{n_l^r}.$$

If both household groups are of the same size -  $n_h = n_l$  - and both have the same influence function -  $\omega_h(r_h) = \omega_l(r_l)$  for  $r_h = r_l$  - then (13) and (14) will be satisfied by the same level of rent-seeking expenditures of both interest-groups. Denote this symmetric equilibrium rent-seeking level with  $r^*$ . Such a symmetric equilibrium implies  $\omega_j^r = n_j^r = 1/2$  and the first order condition can be written as follows:

<sup>6</sup> The second order conditions for a maximum are assumed to be satisfied.

$$(15) \quad \hat{\omega}(r^*) = \frac{16[1-\beta][\beta n]^{\frac{1}{\beta-1}} k^{\frac{1-\alpha}{\beta-1}} \lambda^{\frac{2\beta-1}{\beta-1}}}{\alpha^2[\lambda_h - \lambda_l]^2}.$$

Assume  $\frac{d\hat{\omega}(r)}{dr} < 0$  for all  $r$ . The equilibrium level of rent-seeking then rises with all factors that raise the marginal benefit of rent-seeking. This condition will be necessary for a reasonable comparative static analysis in the following section.

### 3. Equilibrium in a Small Open Jurisdiction

With perfect capital mobility, the price of capital is the same in all jurisdictions. For simplicity, assume all jurisdictions are small so that a single jurisdiction has no influence on the capital price  $\bar{p}$ . The following condition then determines the equilibrium capital intensity in a representative jurisdiction:

$$(16) \quad [1-\alpha]G^\beta k^{-\alpha} = \bar{p}.$$

The capital intensity increases with a rising infrastructure level according to the following equation:

$$(17) \quad \frac{dk}{dG} = \frac{\beta k}{\alpha G}.$$

The influence of infrastructure policy on the factor prices is completely shifted from the mobile factor capital to the immobile factor land in a small open jurisdiction. An increasing level of infrastructure in the jurisdiction has no effects on the price of capital which remains constant at  $\bar{p}$ . The land rent increases all the more with capital mobility because a rising infrastructure level attracts mobile capital from outside the jurisdiction which raises the land rent. The net income of household  $j$  is affected by the domestic infrastructure level according to the following equation:<sup>7</sup>

$$(18) \quad \frac{dy_{j_o}}{dG} = \beta G^{\beta-1} k^{1-\alpha} \lambda_j - \frac{1}{n}.$$

To compare the benefits of the infrastructure in an open jurisdiction case with the benefits in a closed jurisdiction, assume all jurisdictions are symmetric. The capital intensity in a closed jurisdiction then will be equal to the capital intensity in a small open jurisdiction. The marginal effect of a rising infrastructure level on the income of a land-abundant household will be larger in a small open jurisdiction than in a closed jurisdiction. In contrast, a household with a low

<sup>7</sup> The subscript  $o$  denotes the open jurisdiction.

land endowment will receive less marginal benefits from a rising level of infrastructure with capital mobility than without. The income maximising levels of infrastructure for both household groups thus diverge with the introduction of capital mobility. This result can be explained with the fact that the marginal benefit of an increasing infrastructure level shifts from the equally distributed factor capital to the unequally distributed factor land.

The following equation gives the first order condition for the equilibrium level of infrastructure in a small open jurisdiction:

$$(19) \quad \beta G^{\beta-1} k^{1-\alpha} \left\{ \lambda + [\lambda_h - \lambda_l] [\omega'_h - n'_h] \right\} - \frac{1}{n} = 0.$$

The second order condition will be satisfied with capital mobility, if and only if  $\beta < \alpha$ . This follows from deriving (19) with respect to G after inserting from (16) for k:

$$(20) \quad \beta \left[ \frac{\beta}{\alpha} - 1 \right] G^{\beta-2} k^{1-\alpha} \left\{ \lambda + [\lambda_h - \lambda_l] [\omega'_h - n'_h] \right\} < 0.$$

For the following, the condition  $\beta < \alpha$  is assumed to be satisfied. Equation (21) then explicitly determines the equilibrium level of infrastructure in a small open jurisdiction ( $\mu_o \equiv \lambda + [\lambda_h - \lambda_l] [\omega'_h - n'_h]$ ):

$$(21) \quad G_o = [\mu_o \beta n]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}}.$$

A comparison of (21) and (8) shows the influence of capital mobility on the equilibrium level of infrastructure: For a given  $\omega'_h > n'_h$ , the level of infrastructure increases with the introduction of capital mobility. As shown in the preceding section, infrastructure exceeds the no-redistribution level in this case. With the introduction of capital mobility, the redistribution effect of local infrastructure policy increases and so does the equilibrium level of infrastructure. For  $\omega'_h < n'_h$ , the level of infrastructure declines with capital mobility. For  $\omega'_h = n'_h$  finally, the equilibrium level of infrastructure remains unaffected from the introduction of capital mobility on the same level as in the closed jurisdiction.

An increasing relative weight of land-abundant households affects the equilibrium level of infrastructure according to the following equation:

$$(22) \quad \frac{dG_o}{d\omega'_h} = \frac{[\lambda_h - \lambda_l]}{1-\beta} \mu_o^{\frac{\beta}{1-\beta}} [\beta n]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}}.$$

With the solution of the second stage of the game, the equilibrium rent-seeking expenditures can be derived for the small open jurisdiction. Inserting (18), (21) and (22) in (12) gives the following first order conditions for the interest groups:

$$(23) \quad \frac{[\lambda_h - \lambda_l]^2 [n\beta]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} \mu_o^{\frac{2\beta-1}{1-\beta}}}{1-\beta} [\omega_l^r]^2 \omega_h^r \hat{\omega}_h = \frac{1}{n_h^r},$$

$$(24) \quad \frac{[\lambda_h - \lambda_l]^2 [n\beta]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} \mu_o^{\frac{2\beta-1}{1-\beta}}}{1-\beta} [\omega_h^r]^2 \omega_l^r \hat{\omega}_l = \frac{1}{n_l^r}.$$

For  $n_h = n_l$  and  $\omega_h(r_h) = \omega_l(r_l) \forall r_h = r_l$ , a symmetric rent-seeking vector solves (23) and (24). This symmetric equilibrium is given by equation (25):

$$(25) \quad \hat{\omega}(r_o^*) = \frac{16[1-\beta][\beta n]^{\frac{1}{\beta-1}} k^{\frac{1-\alpha}{\beta-1}} \lambda^{\frac{2\beta-1}{\beta-1}}}{[\lambda_h - \lambda_l]^2}.$$

A comparison of (25) and (15) shows the following:  $\hat{\omega}(r_o^*) = \alpha^2 \hat{\omega}(r^*)$ . As  $\hat{\omega}(r)$  is assumed to be monotonically decreasing in  $r$ , this implies  $r_o^* > r^*$ . Rent-seeking expenditures in a small open jurisdiction therefore exceed rent-seeking expenditures in a closed jurisdiction.

#### 4. Asymmetric Rent-Seeking

This section derives the effects of factor mobility on rent-seeking for the case where rent-seeking of land-abundant and land-poor households is not exactly symmetric. For simplicity, the most extreme case of asymmetry is considered where only one of both interest groups is active in rent-seeking and the other group has rent-seeking expenditures of zero.<sup>8</sup>

##### a) Rent-Seeking of Land-Abundant Households

Assume that the objective function of the active interest group is strictly concave in its rent-seeking expenditures. The marginal benefit of rent-seeking then declines continuously with rising rent-seeking expenditures. Define the following function

$$(\Omega \equiv [1-\beta]^{-1} [\beta n]^{\frac{1}{1-\beta}} k^{\frac{\alpha-1}{\beta-1}} [\lambda_h - \lambda_l]^2):$$

$$(26) \quad x(\omega_h^r, \vartheta) \equiv \Omega \cdot \left\{ \lambda + \vartheta [\lambda_h - \lambda_l] \left[ \omega_h^r - n_h^r \right] \right\}^{\frac{2\beta-1}{1-\beta}} \vartheta^2.$$

The equation  $x(\omega_h^r, \vartheta) [\omega_l^r]^2 \omega_h^r \hat{\omega}_h = [n_h^r]^{-1}$  then will represent the first order condition (13) for the closed jurisdiction, if  $\vartheta = \alpha$  and it will represent the first order condition (23) for the open jurisdiction, if  $\vartheta = 1$ . If the function  $x(\omega_h^r, \vartheta)$  monotonically increases in  $\vartheta$ , then

<sup>8</sup> This situation will arise, if the marginal influence of rent-seeking on the political weight is sufficiently small for one of the interest groups.

$x(\omega'_k, 1) > x(\omega'_k, \alpha)$ . The rent-seeking expenditures of the labour-abundant households then will unambiguously rise with the introduction of capital mobility. The influence of  $\vartheta$  on  $x(\omega'_k, \vartheta)$  is given by the following equation ( $\mu(\vartheta) \equiv \lambda + \vartheta[\lambda_k - \lambda_l][\omega'_k - n'_k]$ ):

$$(27) \quad \frac{\partial x(\cdot)}{\partial \vartheta} = \frac{\Omega \mu(\vartheta)^{\frac{3\beta-2}{1-\beta}} \vartheta}{1-\beta} \cdot \{[2-2\beta]\lambda + \vartheta[\lambda_k - \lambda_l][\omega'_k - n'_k]\}.$$

For  $r_k > 0$  and  $r_l = 0$  the term  $[\omega'_k - n'_k]$  is positive. The function  $x(\cdot)$  then increases monotonically in  $\vartheta$ . Capital mobility therefore causes rising rent-seeking expenditures also in the case of asymmetric rent-seeking where only the group of land-abundant households tries to influence policy.<sup>9</sup>

#### b) Rent-Seeking of Land-Poor Households

If only land-poor households are active in rent-seeking, then the rent-seeking equilibrium in a closed jurisdiction will be given by (14) and the equilibrium in an open jurisdiction will be given by (24). With  $x(\omega'_k, \vartheta)$  as defined in (26), these equations may be represented by  $x(\omega'_k, \vartheta)[\omega'_k]^2 \omega'_l \hat{\omega}_l = [n'_l]^{-1}$ . The marginal influence of  $\vartheta$  on  $x(\cdot)$  is again given by (27). However, the sign of (27) can not be determined unambiguously for  $\omega'_k < n'_k$ . The rent-seeking expenditures of land-poor households therefore might decline with the introduction of capital mobility. For an interpretation of this result, the influence of capital mobility on the marginal benefit of rent-seeking may be divided up into the influence on  $\frac{dy_l}{dG}$  and into the influence on  $\frac{dG}{d\omega'_k}$ . Inserting (19) into (18) gives:

$$(28) \quad \frac{dy_{l_o}}{dG} = - \frac{[\lambda_k - \lambda_l] \omega'_k}{n \mu_o}.$$

The absolute value of  $\frac{dy_{l_o}}{dG}$  exceeds the absolute value of  $\frac{dy_l}{dG}$  for a given level of rent-seeking. This follows from comparing (28) with (11).<sup>10</sup> A changing infrastructure level therefore has a larger influence on the income of land-poor households in an open jurisdiction compared

<sup>9</sup> Oates, Schwab (1988: 349) conjecture in a slightly different framework that the vigorous efforts of local governments to attract business capital might be explained by the influence of certain interest groups. The results of this section support this view: The rent-seeking influence of land-abundant households leads to a larger infrastructure level in an open economy compared to a closed economy.

<sup>10</sup> The right-hand-side of (28) would be equal to the right hand side of (11) for  $\alpha=1$ . Because (11) decreases monotonically in  $\alpha$  and because  $\alpha < 1$  the right hand side of (28) is more negative than the right-hand-side of (11).

to a closed jurisdiction. This effect has a positive influence on the rent-seeking level in an open jurisdiction. For the influence of capital mobility on  $\frac{dG}{d\omega'_k}$  compare (9) with (22). These two equations can be rewritten as follows:

$$(29) \quad \frac{dG}{d\omega'_k} = \frac{\alpha[\lambda_k - \lambda_l]}{[1 - \beta]\mu} G,$$

$$(30) \quad \frac{dG_o}{d\omega'_k} = \frac{[\lambda_k - \lambda_l]}{[1 - \beta]\mu_o} G_o.$$

The first factor on the right-hand-side of these equations is larger in an open jurisdiction than in a closed jurisdiction. The marginal influence of rent-seeking on the infrastructure level therefore would increase with the introduction of capital mobility, if the infrastructure level remained constant. However, as shown in section 3, capital mobility leads to a declining infrastructure level for  $\omega'_k < n'_k$ . The marginal influence of rent-seeking on the infrastructure level then may rise or decline with capital mobility. If it declines, then this effect might outweigh the positive influence of capital mobility on  $\left|\frac{dy_l}{dG}\right|$  and rent-seeking might decrease with capital mobility.

Rearranging (27) gives a sufficient condition which excludes the case of decreasing rent-seeking:

$$(31) \quad \frac{\partial x(\cdot)}{\partial \vartheta} = \frac{\Omega \mu(\vartheta)^{\frac{3\beta-2}{1-\beta}} \vartheta}{1-\beta} \cdot \{[1 - 2\beta]\lambda + \mu(\vartheta)\},$$

Equation (31) implies:

$$(32) \quad \frac{\partial x(\cdot)}{\partial \vartheta} > 0 \text{ for } \beta < \frac{\lambda + \mu(\vartheta)}{2\lambda}.$$

The condition  $\beta \leq 1/2$  is sufficient for  $\frac{\partial x(\cdot)}{\partial \vartheta} > 0$ . The rent-seeking expenditures of capital-poor households then unambiguously increase with the introduction of factor mobility. Only for  $\beta > 1/2$  a declining rent-seeking level can not be excluded generally.

## 5. Concluding Remarks

The model presented in this paper can be extended in several ways to yield additional insights into the political determinants of local infrastructure policy. Two of these extensions may be mentioned here: First, the assumption of perfectly symmetric jurisdictions might be relaxed. In general, jurisdictions differ with respect to their size, to their production technology and to their factor endowment. Interjurisdictional differences with respect to these factors influence the equilibrium levels of infrastructure and rent-seeking. In addition, in the case of asymmetric large open jurisdictions, the governments have an incentive to influence the capital price strategically. To consider these factors appropriately, the model set up in this paper might be merged with one of the first group of models mentioned in the introduction. As a second extension of this paper, further types of redistribution conflicts can be investigated: For example, different production sectors in the jurisdiction might benefit differently from local infrastructure. Sector-specific immobile production factors then have an incentive for sector specific rent-seeking. The influence of infrastructure policy on the rent of the immobile specific factor presumably increases with the mobility of the non-specific factor. This effect might aggravate redistribution conflicts and cause increasing rent-seeking comparable to the results of this paper. A formal framework to investigate this issue has been developed by Clarida, Findlay (1991).<sup>11</sup>

In another paper (Lorz, forthcoming) I have investigated the effects of factor mobility on a different kind of redistribution conflict. In that paper, a capital tax is raised to redistribute between households with different capital incomes. With the introduction of capital mobility, the households can evade this tax by investing abroad. The redistribution effect of the capital tax then declines and households reduce their lobbying expenditures. Taken together the results of this paper and of Lorz (forthcoming) show in general how factor mobility influences redistribution conflicts between different owners of mobile and immobile production factors: With factor mobility, the impact of local fiscal policy on the factor incomes is shifted from the mobile to the immobile factors of production. On the one hand, this effect lowers redistribution conflicts between owners of mobile factors. On the other hand it aggravates redistribution conflicts between owners of immobile factors. This paper has provided an example for the latter effect.

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<sup>11</sup> See also Findlay (1995) and Hillman (1995).

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