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INTER-CITY MIGRATION AND POLICY

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Abstract: The seminal Buchanan-Ng club model is used to analyze optimal allocation of population between non-homogenous cities. Because of externalities (marginal welfare effects), migration cannot alone ensure efficiency and policy intervention is needed. In principle, a first-best optimum is achievable, if the externalities are properly calculated and internalized to people's decisions by local or centralized policy. Yet, implementation of these policies is not so straightforward in practice. Consolidation of central and local policies based on average welfare is more promising. In club theoretic terms, the main finding is that total-economy viewed policy making is not necessary to evoke Pareto efficiency even when the number of clubs is fixed. In other words, neither Pigouvian policy instruments nor Coasian bargaining is needed to reach the first-best optimum.

Key words: Coasian bargaining, Pigouvian taxes/subsidies, total-economy/within-club viewpoint

JEL classification: R12, R23

1 Introduction

Cities attract people for many reasons. Cities provide high real wages due to specialization, effects of scale and scope, savings in transaction costs, cost-sharing in the construction of housing and infrastructure etc. Other attractions arise e.g. from broad variety of choices in consumption, leisure, social relationships and other stimulations of city life. Yet, uncontrolled growth, overly dense construction, traffic congestion, environmental damage and other such malfunctions cause inevitable disadvantages, too. Therefore, optimal city size and efficient allocation of people between cities are among the key issues in the literature on urban economics (Richardson, 1973; 1978; Henderson, 1985; Tolley & Crihfield, 1987; Combes et al., 2005).

In this paper, a club theoretic city model is applied to examine the emergence of efficient allocation of people between cities with particular emphasis on policy implications. The basic market mechanism behind the formation and development of cities is based on migration decisions that people make according to personal welfare comparisons. The main problem with migration is that external effects caused to other actors are not anticipated.

The paper builds on the seminal club theoretic model of Buchanan (1965) and Ng (1973) with homogenous people. A common view is that, in this basic model, migration based on maximization of personal welfare leads to Pareto optimality, precluded that the clubs are homogenous, the number of clubs is endogenous and that there is no integer problem. Furthermore, if the clubs are non-homogenous and the number of clubs is fixed, a first-

best solution is not granted, and some kind of policy intervention is needed (Cornes & Sandler, 1986).

In club theory, policy-making in the clubs (or locally in the cities), is characterized by *within-club* and *total-economy* viewpoints in setting the policy goals (Sandler & Tschirhart, 1980; Cornes & Sandler, 1986). The key aspect of this classification is that the within-club viewpoint is based on *average* welfare whereas the total-economy viewpoint is based on *marginal* welfare. The average measures concern people's own welfare experiences whereas the marginal measures include the external effects caused to other actors in the city. Quite naturally, national level policy that operates between the clubs should follow the total-economy rule.

The paper proceeds as follows. In Section 2, the simplified Buchanan-Ng model of a city is presented, and the inefficiency of pure migration solution in the case of two non-homogenous cities is demonstrated. Section 3 studies optimal policy-making with special reference to the informational preconditions of the total-economy approach. Purely local and purely national policies are examined first, and the superiority of a combination of local and national policies is then attested. The main argument is that the total-economy approach involving either Pigouvian policy instruments or Coasian bargaining is not needed to gain first-best optimality. Section 4 concludes the findings.

2 Cities and migration

2.1 The basic model

A city is a club formed by its residents who consume the club good including all elements of everyday welfare, material and immaterial, private and public. The club nature of the city involves also technological externalities which make utility depend on city size.

Individual resident's utility from belonging to the city thus reads

$$u = u(q, N), \tag{1}$$

where q is the quantity of the club good and N is population. Population is a relevant measure of city size taken that the geographical area of the city is fixed. In (1), q is assumed a normal good with declining marginal utility. Taking population fixed, $u_q > 0$ and $u_{qq} < 0$ say that utility is increasing in q with a diminishing slope. As to N , the residents are assumed to benefit from city growth up to a certain congestion point after which further growth becomes harmful. The benefits first rise because of non-monetary gains from city growth, but eventually the negative effects start to dominate the gains. Fixing q and taking N variable, the graph of (1) has an inverse U shape reflecting a representative citizen's direct benefit of, or willingness to pay for city life.

Belonging to the club that is living in the city has its monetary side, too. It is simply assumed that the total cost function

$$C = C(q) \tag{2}$$

with $C' > 0$, $C'' > 0$ applies for all private and public costs of producing the elements of city life. Externalities in production caused by city size are omitted. Assuming identical tastes and equal cost-sharing between the city residents, individual costs read

$$c = \frac{1}{N}C(q). \tag{3}$$

Taking q fixed and solving for N , the net benefit of an individual city resident

$$\varphi = u - c \tag{4}$$

is maximized when

$$\frac{du}{dN} = -\frac{c}{N}. \tag{5}$$

Equation (5) says that the disutility from city growth must be just balanced by the gain from cost-sharing. This is the classical within-club result (Buchanan, 1965). From the total-economy viewpoint emphasized by Ng (1973), the net benefit of the whole city,

$$\Psi = N\varphi, \tag{6}$$

must be maximized. Using (1), (3) and (4), the optimum condition of maximization of (6) reads

$$\frac{d\psi}{dN} = u + N \frac{du}{dN} = 0. \quad (7)$$

Equation (7) says that the city should grow until the marginal net benefit caused by an additional resident to the residents of the whole city goes to zero. Figure 1 below illustrates the model and the two conditions for optimal city size.

(Figure 1 here)

In Figure 1, *Panel a* depicts the total utility function $U = Nu$, the total cost function (2) and the total net benefit function (6). *Panel b* of the Figure depicts the individual utility function (1), individual cost share function (3), the individual net benefit function (4) and the marginal net benefit function (7), denoted by θ . By (7), function θ intersects the u function at its maximum point from above. Likewise, by (6),

$$\theta = \varphi + N \frac{d\varphi}{dN} \quad (8)$$

which says that the θ curve intersects also the φ curve at its maximum point from above. The message of (7) and (8) is that a marginal migrant does not anticipate the externalities that he causes to other citizens and therefore does not take into account his impact on the

total net benefit and on the individual net benefit. Before the top points of the total and individual net benefit curves, marginal effects exceeding the average value make the latter increase and vice versa.

In Figure 1, the within-club optimum condition (5) is satisfied at N_w while the total-economy optimum condition (7) is satisfied at N_t . In particular, both conditions set goals for collective action. However, since N_w is optimal for an individual citizen, condition (5) could be satisfied also by purely private decisions (via *exit*) that is by moving to a city of exactly this size. This would necessitate lots of options and make migrants continuously on the move. Therefore, in practice, both N_w and N_t can be chosen only collectively, through local democracy (via *voice*) so that the city itself acts as a market agent that optimizes on its size (Laurila, 2008).¹

There are three measures of total net benefit, or total welfare, in Figure 1. In *Panel a*, ψ_w is total welfare in the within-club solution and ψ_t is that in the total-economy solution the latter being clearly higher. In *Panel b*, total welfare can be measured either by the area beneath the θ curve or by the product of population and individual net benefit. The latter measure at the within-club solution is $N_w \times \varphi_w$ which is smaller than $N_t \times \varphi_t$ at the total-economy solution, because the decline from φ_w to φ_t is more than compensated by the increase from N_w to N_t in the number of included people.

¹ Bailey (1999) uses the concept *exit* to refer to purely private choices between the local economies through migration, and the concept *voice* to refer to collective decision-making in the local public economy.

For further purposes, the relevant concepts are the φ and θ curves of Figure 1, *Panel b*. The inverse U shaped φ curve captures the net of positive and negative agglomeration economies that affect average citizen's welfare in the city. Thus, it reflects people's factual experiences and can be labeled as *average welfare* curve. The θ curve, labeled as *marginal welfare* curve, captures also the externalities caused to other people thus representing the demand for migrants from the total-economy point of view. The difference between the φ and θ curves at any population allocation measures the amount of externalities presented by the term $Nd\varphi/dN$ on the right side of expression (8). Therefore, it is the θ curve that sets the first-best condition for allocative efficiency.

2.2 Migration between cities

Assume that migration is free and costless and that people have perfect foresight of local differences in the factors of their welfare. Based on this information, people make rational welfare maximizing choices (that is market-like exit decisions) about their location. If there are differences between places in terms of welfare, there also occurs systematic migration towards those places with higher welfare offers.

Assume that the economy consists of two cities, city A and city B. Goods and factor markets are competitive, people have identical preferences, and firms have identical production technologies everywhere. The cities are composed of local market areas and they also form local public economies that provide all public goods. Public provision is conducted by efficiently working local democracy (voice) within the cities. It is assumed that only the current citizens of each city participate in the collective decision-making.

The production factors of the economy are land, capital and labour. The stocks of land and capital are fixed and immobile between the cities. Labour, measured in terms of population N is also fixed, but mobile between the cities through migration of people. Inter-city commuting is excluded. Assuming different endowments of the immobile factors makes the cities differ in their potential capacity to create welfare to their residents. In this respect, city A is assumed to be better equipped.

In Figure 2, the average and marginal welfare curves are drawn for the two cities so that the length of the horizontal axis equals the total population of the economy. The curve set is drawn from left to right for city A and from right to left for city B.

(Figure 2 here)

In Figure 2, the cities are so big that their φ and θ curves intersect on decreasing ranges. Migration produces a stable market allocation N_e in point e , because starting from left or right of e implies a welfare gap that causes systematic migration towards N_e . Yet, N_e is not an efficient solution. The welfare of the whole economy is maximized when the area below the two marginal welfare curves is at its largest. This is true in point ε at N_ε where

$$\theta^A = \theta^B. \tag{9}$$

By (9), the marginal welfare effects must match in both ends of the migration flow. The condition actually equals the total-economy efficiency condition (7) with the baseline being not zero but the positive marginal welfare offered by the alternative location. Allocation N_ε is to the left from N_e in Figure 2, because the gain from reducing harmful congestion in the more prosperous city A is higher than the cost of increasing it in city B. The dead weight loss in the migration equilibrium at N_e is measured by the area $\varepsilon e' e''$.

For another benchmark case, assume that the total population of the economy is initially so small that the cities operate on the increasing ranges of their φ and θ curves. Figure 3 below illustrates the effects of migration between the cities A and B in that case.

(Figure 3 here)

In Figure 3, the φ curves intersect in point e implying that systematic migration should not exist. However, any exogenous impulse to either direction opens a welfare gap thus motivating systematic migration to the same direction. Thus, the solution at e is not stable, and migration would end to a corner solution the whole population living in either of the two cities, depending on the direction of the initial shock. The efficiency condition (9) holds in point ε where the θ curves intersect. Allocation N_ε is to the right from N_e , because the gain from exploiting agglomeration economies in the more prosperous city A is higher than the cost of losing them in city B. Of course, allocation N_ε would not be stable either because of the migration-inducing welfare gap $\varepsilon' \varepsilon''$.

3 Policy considerations

3.1 Local policy

By the above analysis it is clear that some kind of collective action is needed to secure efficiency. Local policy is one option. In this respect, the cities can take either the within-club or the total-economy viewpoint. As was noted above, only the total-economy viewpoint is in line with the efficiency condition (9). Still, consideration of within-club optimization is worthwhile for further purposes of the paper.

From the within-club viewpoint cities optimize their sizes by controlling migration to maximize average welfare. The policy instruments include land use and planning decisions, dimensioning of social housing, sizing of public provision etc. The instruments can be implemented most successfully in growing cities where it is rather easy to stop further immigration at the optimal size. Overly crowded cities might also be considered able to induce emigration by downsizing their provision, but that would contradict the assumption of perfect local democracy based on the voice of current residents. In any case, immigration can not be induced or emigration stopped by these instruments.

In the case of big cities of Figure 2, the within-club optimum for city A is N_a and that for city B is N_b . Comparing to the efficient allocation N_e , the dead weight losses are measured by the areas $a\epsilon a'$ at N_a and $\epsilon b b'$ at N_b . Quite obviously, an ultimate within-club optimum can be reached only if the initial allocation is either to the left from N_a or to the right from N_b . Yet, the rule can be applied also between N_a and N_b in order to prevent

further deterioration of average welfare with the smaller dead weight losses the closer the policy-induced solution would be to N_e .

In the case of small cities of Figure 3, starting leftwards from the unstable point e , city A would stop immigration at N_a thus causing the welfare gap aa'' . Starting rightwards from e , city B would stop immigration at N_b causing the welfare gap bb'' . These solutions may be better or worse than the corner solutions, but they are certainly worse than the solution at N_e : the dead weight losses are $\varepsilon a'a$ at N_a and $bb'\varepsilon$ at N_b . Migration cannot be stopped by the within-club rule between N_a and N_b , but beyond them it is possible.

The total-economy viewpoint in local policy means that the policy goals are set according to the marginal welfare concepts. Pigouvian taxation/subsidization and Coasian bargaining are classical approaches in reaching the goals (Cornes & Sandler, 1986, pp. 48-66). Figure 4 presents analyses of these two approaches in the case of big cities.

(Figure 4 here)

First, take the Pigouvian approach by assuming that both cities recognize their own and the other city's marginal welfare schedules, and internalize the negative externalities of migration to people's decision parameters. The externalities are calculated in both cities at N_e , and the average welfare schedules are corrected by Pigouvian taxes. In Figure 4, the proper taxes are t_A in city A and t_B in city B, which press the φ curves downwards to φ_i^A and φ_i^B resulting in average welfare equalization at N_e . The result is stable because the

shifted φ curves intersect on their decreasing ranges at point ε . Taking into account the refundable tax revenues $t_A \times N_\varepsilon$ and $t_B \times (N - N_\varepsilon)$, the result is also efficient. However, refunding the tax revenues to the residents of the cities opens the welfare gap $\varepsilon' \varepsilon''$ thus causing instability in the longer term. To secure stability, city A should stop immigration at N_ε with the policy arsenal described in the above within-club case.

Second, take the Coasian approach of costless bargaining. Assume now that the cities know only their own marginal welfare schedule, but not that of the other city. Since θ_B exceeds θ_A at N_ε in Figure 4, city B can recruit people from city A as far as it can pay more to the marginal migrant than A is willing to pay to retain him. This is true up till N_ε . Starting from point e , any immigration subsidy offered by city B shifts the φ^B curve upwards thus shifting the migration equilibrium leftwards along φ^A . The subsidy offer can be elevated up to s_B which shifts the average welfare curve to φ_s^B , equalizes the welfare gap $\varepsilon' \varepsilon''$ and shifts the migration solution to ε'' at N_ε . The result is efficient, because the subsidies must inevitably be tax-financed so that $s_B \times (N - N_\varepsilon) = t'_B \times (N - N_\varepsilon)$. Yet, the tax-finance causes stability problems. The eventual welfare disparity $\varepsilon' \varepsilon''$ at N_ε means that the solution is not stable in the longer run unless city A stops immigration at N_ε . Note that the policy intervention is now financially smaller than in the Pigouvian case.

The case of small cities is somewhat more complicated. Figure 5 below demonstrates the Pigouvian and Coasian versions of total-economy viewed local policy in this case.

(Figure 5 here)

Start again by assuming that the cities have perfect information of all marginal welfare schedules. In Figure 5, simultaneous internalization of positive externalities at N_e precludes Pigouvian subsidies in both cities to shift the φ curves upwards so that they intersect in point ε . Taking into account the tax-financing of the subsidies, $s_A \times N_e = t_A N_e$ and $s_B \times (N - N_e) = t_B \times (N - N_e)$, the result is efficient. Yet, because of the budget constraint and the induced welfare gap $\varepsilon' \varepsilon''$, long-term stability precludes again that city A stops immigration at N_e , which is reasonable from the total-economy viewpoint.

Second, assume that the cities know only their own θ curves and enter Coasian bargaining over residents in Figure 5. To the left from N_e , θ_A exceeds θ_B making A able to recruit people from city B by immigration subsidies. An equalizing subsidy turns the migration flow towards A thus enabling iterative reduction of the subsidy to zero at N_e . Between N_e and N_e , subsidies are not needed, because systematic migration draws people automatically to city A. After N_e , θ_B exceeds θ_A so that city B becomes able to stop emigration by compensating the difference of average welfares. The stability of allocation N_e can be seen by considering any initial position rightwards from N_e : since an equalizing subsidy issued by city B turns the migration flow towards B, it can be iteratively reduced to s'_B so that the welfare gap $\varepsilon' \varepsilon''$ is equalized at N_e . Taking into account the budget constraint $s'_B \times (N - N_e) = t'_B \times (N - N_e)$, the solution is efficient. The final policy intervention is again financially smaller than in the Pigouvian version, but, during the phase of adjustment, huge budgetary transactions may be needed. Thus, with small cities, the bargaining process is quite indirect in nature.

3.2 Centralized policy

The applicability of the total-economy viewpoint on the local level may be challenged for good reasons. The competence of local policy-makers in estimating the abstract marginal welfare curves can be questioned, the setting is open for suboptimal gaming between the cities, and some instability problems arise due to the financing of the first-best policy measures. In particular, externalities raise the fundamental issue concerning average and marginal concepts. It is quite unreasonable that utility maximizing people who base their exit choices on average welfare would base their voice choices on marginal welfare which they do not even anticipate (Laurila, 2008). As a matter of fact, the assumption that only the current welfare maximizing citizens can use voice blocks out the application of condition (9) and thus the first-best solution.

A common consent is that a total-economy viewed centralized policy is able to bypass most of the above challenges: the marginal effects can be estimated better, gaming can be avoided and the financial problems can be eased. To reach the policy goals, administrative and economic instruments can be used (Cornes & Sandler, 1986, p. 48). Administrative instruments can be tried to force the cities to the first-best solution by setting limits to their planning and land use, social housing and public goods provision etc. In Figures 4 and 5, this would mean that some people are indirectly forced to reallocate so that N_e is met. However, forcing migration might be considered as rather violent action in market economy. The situation of Figure 5 is also open for contractive

local actions in city A, because welfare gains could be sought by surpassing the regulation by voice.

Economic instruments fit better in the market economy. A standard economic instrument of centralized policy is to use inter-city Pigouvian transfers to level the welfare gap at the optimal allocation thus making the migration solution coincide at that point. Since φ^A exceeds φ^B at N_ε not depending on if the cities are big or small, the relevant budget constraint reads

$$t_A \times N_\varepsilon = s_B \times (N - N_\varepsilon) \quad (10)$$

Figure 6 shows how centralized Pigouvian transfers operate in the case of big cities.

(Figure 6 here)

In Figure 6, the central government issues Pigouvian taxes on the residents of city A and delivers the tax revenue to the residents of city B by Pigouvian subsidies so that (10) holds at N_ε . The tax t_A in city A shifts the φ^A curve downwards and the transfer s_B in city B shifts the φ^B curve upwards so that average welfares equal in point ε^* . Since total welfare equals that of the first-best allocation in Figures 2 and 4, the solution is efficient. The transfer policy pools the exogenously limited welfare creation potentials of the cities. That both curves remain declining means that the solution is also stable.

However, in the case of small cities where the migration pattern is initially unstable, the centralized transfer policy does not operate. This is illustrated in Figure 7.

(Figure 7 here)

In Figure 7, the central government imposes a Pigouvian tax t_A to the citizens in city A and gives a Pigouvian subsidy s_B to the citizens of city B so that the φ curves shift to φ_t^A and φ_s^B thus making them intersect in point ε^* . The solution would be efficient. However, equalizing average welfares at N_e does not function, because systematic migration draws away from point ε^* along the rising φ_t^A and φ_s^B curves. Thus, in the case of small cities, centralized transfer policy cannot alone produce a stable first-best population allocation.

3.3 Consolidation of local and centralized policy

The above analysis shows that the standard Pigouvian and Coasian principles are fairly applicable to reach first-best solutions by both purely local and purely centralized policy. However, especially in the practically very relevant case of small cities, some problems arise. In any case, the most disturbing feature of both approaches is that they must be based on total-economy viewed information of the marginal welfare schedules. As Cornes & Sandler (1986, p. 61) points out, it is always worthwhile to consider alternative schemes that are less ambitious and have less exacting information requirements.

Quite naturally, the dichotomy between local and centralized policy brings forth a third case study in which both policies work contemporarily. Assume that this consolidated

policy package consists of average welfare equalizing lump-sum transfers operated by the central government, and within-club type optimization conducted locally by the cities. The main virtue of this policy version is that the assumption of perfect anticipation of the marginal welfare schedules can be omitted also on the side of the central government. Figure 8 illustrates the working of the policy package in the case of big cities.

(Figure 8 here)

Start again from the free migration allocation N_e in Figure 8. The first step is that the central government assesses the situation. The stable migration equilibrium means that φ^A should exceed φ^B to the left of N_e and vice versa. The direction of N_e can be simply estimated by ordinal comparison of the negative externalities at N_e . The right way to go is towards higher public nuisance that is leftwards from N_e .

The next step is that central government starts to operate a lump-sum transfer scheme by issuing iteratively increasing lump-sum taxes on the residents of city A and transferring them in the form of lump-sum subsidies to the residents of city B. There is no need for the central government to know the exact values of φ^A and φ^B – it suffices that the budget constraint (10) holds during iteration. On impact, the φ curves shift so that their momentary intersection points occur on the dashed locus starting leftwards from point e in Figure 8. The locus of the momentarily equalized average welfares in the cities creates a common φ^{AB} curve to them thus giving the relevant welfare measure to their residents. The φ^{AB} curve reaches its maximum value in point e^* .

The final step is that the iteration of the policy parameters is stopped at point ε^* where city B is observed to stop immigration along the φ^{AB} curve from its within-club viewpoint. The result is stable and also efficient, because it is effectively the same as the Pigouvian result of Figure 6 above.

Figure 9 below illustrates the respective case of small cities.

(Figure 9 here)

Start by assuming that city A has optimized its size at N_a in Figure 9. The solution is stable by the policy of city A, but there is a wide welfare gap between the cities. To equalize the gap at N_a , the central government imposes lump-sum taxes on the citizens of city A and grants lump-sum subsidies to the citizens in city B under the budget constraint (10). The transfer policy shifts the φ^A curve downwards and the φ^B curve upwards so that average welfares are momentarily equalized in the intersection of the shifted φ curves in point α . However, the intervention breaks the stability of the solution, because local policy of city A can only stop immigration, but not prevent emigration. Thus, systematic migration starts sooner or later towards city B. During the phase of migration, time consistent transfers under the budget constraint (10) at any allocation to the left from N_a produce momentary solutions along the dashed locus starting leftwards from point α .

On the other end, starting from N_b optimal from the point of view of city B, equalization of the welfare difference by centralized transfer policy under the budget constraint (10) leads to the momentary instable equilibrium in point β from which migration eventually starts towards city A. All momentary welfare equalizing solutions along this migration pattern form the dashed locus drawn rightwards from point β in Figure 9.

In Figure 9, the time-consistent transfer policy that obeys the budget constraint (10) at any population allocation yields the locus $\beta e \alpha$. The locus describes the momentarily equalized average welfares in the two cities thus creating a common φ^{AB} curve with a maximum value in point ε^* . Migration is stopped by local policy at the allocation N_ε not depending on from which direction it is approached. When the central government notes this kind of local policy, it can simply stop the iteration of the policy parameters at the values t_A^* and s_B^* . The end result is the same as the Pigouvian result of Figure 7 above.

Again, the policy package yields first-best efficiency. Now, the policy also evokes stability because the result is optimal for both cities and within-club policy by either city A or city B prevents further migration at N_ε . Corner solutions are omitted if the total population in the economy is big enough to support two cities with inverse U-shaped φ curves.

4 Conclusions

Migration has a major role in the allocation of resources between regions and industries. Assuming that the economy consists of cities, the labour input is the only mobile factor, and that the price information of competitive markets steers people's decisions effectively, the question of allocative efficiency can be reduced to the question of optimal allocation of people between the cities.

When cities are non-homogenous and their number is fixed, efficient allocation of people cannot emerge without policy intervention. The paper presents four kinds of policy approaches. The first one is the within-club optimization of city size conducted purely by local policy. Based on maximization of average welfare, this type of policy is incapable to provide efficiency. The second policy type is local optimization of city size from the total-economy viewpoint based either on Pigouvian taxes/subsidies or on Coasian bargaining. The analysis shows that, in principle, both approaches are valid to yield efficiency, but some instability problems must be solved by other policy means. The third alternative is purely centralized transfer policy based on Pigouvian transfers between the cities. This version works well between big cities, but badly between small cities because of severe instability problems.

The fourth policy version, where local and centralized policies work simultaneously, turns out to be the most promising one. In this version, the cities act from the within-club viewpoint while the central government policy commits to a welfare equalizing lump-sum transfer programme. The whole policy package can then be based on maximization

of average welfare that is the everyday welfare experienced by people without the need for the evaluation of abstract marginal welfare concepts. Centralized equalization of local welfares by lump sum transfers pools the exogenous circumstances between cities thus fulfilling the first-best condition of optimality. Given that the cities simultaneously optimize their size by the within-club rule, the policy produces also a stable solution.

An important implication is that welfare equalization by transfers rather motivates than stabilizes migration. This is because the working of the consolidated policy package is based on inducing migration towards the optimal solution. Therefore, stability is induced only on the long term, after the phase of induced short-term migration, and after the local policy has entered the picture by stopping migration.

In club theoretic terms, the main result is that Pareto-efficiency can be gained in the regime of within-club viewpoint decision-making also when the number of clubs is fixed. Another important theoretical conclusion is that lump-sum transfers combined with within-club optimization of city size in effect produces the same first-best result as Pigouvian transfer policy and Coasian bargaining process at their best, but with less exacting information requirements.

References:

- Atkinson A, Stiglitz J (1980) *Lectures on Public Economics*. McGraw-Hill, London
- Bailey S (1999) *Local Government Economics. Principles and Practice*. MacMillan Press Ltd, Houndmills
- Buchanan J (1965) An Economic Theory of Clubs. *Economica*, February 32: pp. 1-14
- Combes P, Duranton G, Overman H (2005) Agglomeration and the adjustment of the spatial economy. *Papers in Regional Science* 84: 311-349
- Cornes R, Sandler T (1986) *The Theory of Externalities, Public Goods, and Club Goods*. Cambridge University Press, Cambridge
- Fujita M, Thisse J-F (2002) *Economics of Agglomeration. Cities, Industrial Location, and Regional Growth*. Cambridge University Press, Cambridge
- Henderson JV (1985) *Economic Theory and the Cities*. 2nd ed. Academic Press, Orlando
- Laakso S, Loikkanen H (2004) *Kaupunkitalous. Johdatus kaupungistumiseen, kaupunkien maankäyttöön sekä yritysten ja kotitalouksien sijoittumiseen*. Gaudeamus, Helsinki
- Laurila H (2004) Urban Governance, Competition and Welfare. *Urban Studies* Vol 41 Number 3 March 2004: 683-696
- Laurila H (2008) *Economics of Migration, Theoretical Approaches*. VDM Verlag Dr Muller, Saarbrücken
- Laurila H (2009) Kaupunkienvälisen muuttoliikkeen ohjaaminen. *Kunnallistieteellinen Aikakauskirja* (Forthcoming)
- Leunig T, Overman H (2008) Spatial patterns of development and the British housing market. *Oxford Review of Economic Policy* vol. 24 nr 1: 59-78
- McCann P (2001) *Urban and Regional Economics*. Oxford University Press, Oxford

- Mills E, Hamilton B (1984) *Urban Economics*. Harper Collins College Publishers, New York
- Ng Y-K (1973) The Economic Theory of Clubs: Pareto Optimality Conditions. *Economica* vol. 4 no.159 August:
- Prud'homme R, Lee C (1999) Size, Sprawl, Speed and the Efficiency of Cities. *Urban Studies* vol. 35 no. 11
- Richardson H (1973) *The Economics of Urban Size*. Saxon House/Lexington Books, Westmead
- Richardson H (1978) *Regional & Urban Economics*. Penguin Books, Harmondsworth
- Rubinfeld D (1987) The Economics of the Local Public Sector. In: *Handbook of Public Economics*, A. Auerbach and M. Feldstein (eds.). Elsevier Science Publishers B.V. (North Holland), Amsterdam
- Sandler T and Tschirhart J (1980) The Economic Theory of Clubs: An Evaluative Survey. *Journal of Economic Literature*, vol. XVIII, December: 1481-1521
- Scitovsky T (1954) Two concepts of external economies. *Journal of Political Economy*, 62: 143-151
- Stiglitz J (1977) The Theory of Local Public Goods. In: *The Economics of Public Services*, M. Feldman and R. Inman (eds.). MacMillan Press, London
- Tiebout C (1956) A pure theory of local expenditures. *Journal of Political Economy* 64 October: 416-424
- Tolley G, Crihfield J (1987) City Size and Place as Policy Issues. In: *Handbook of Regional and Urban Economics*, vol II, ed. E. Mills. Elsevier Science Publishers B.V. (North-Holland), Amsterdam
- Topham N (1983) Local Government Economics. In: *Public Sector Economics*, Millward et. al. (eds.). Longman, New York

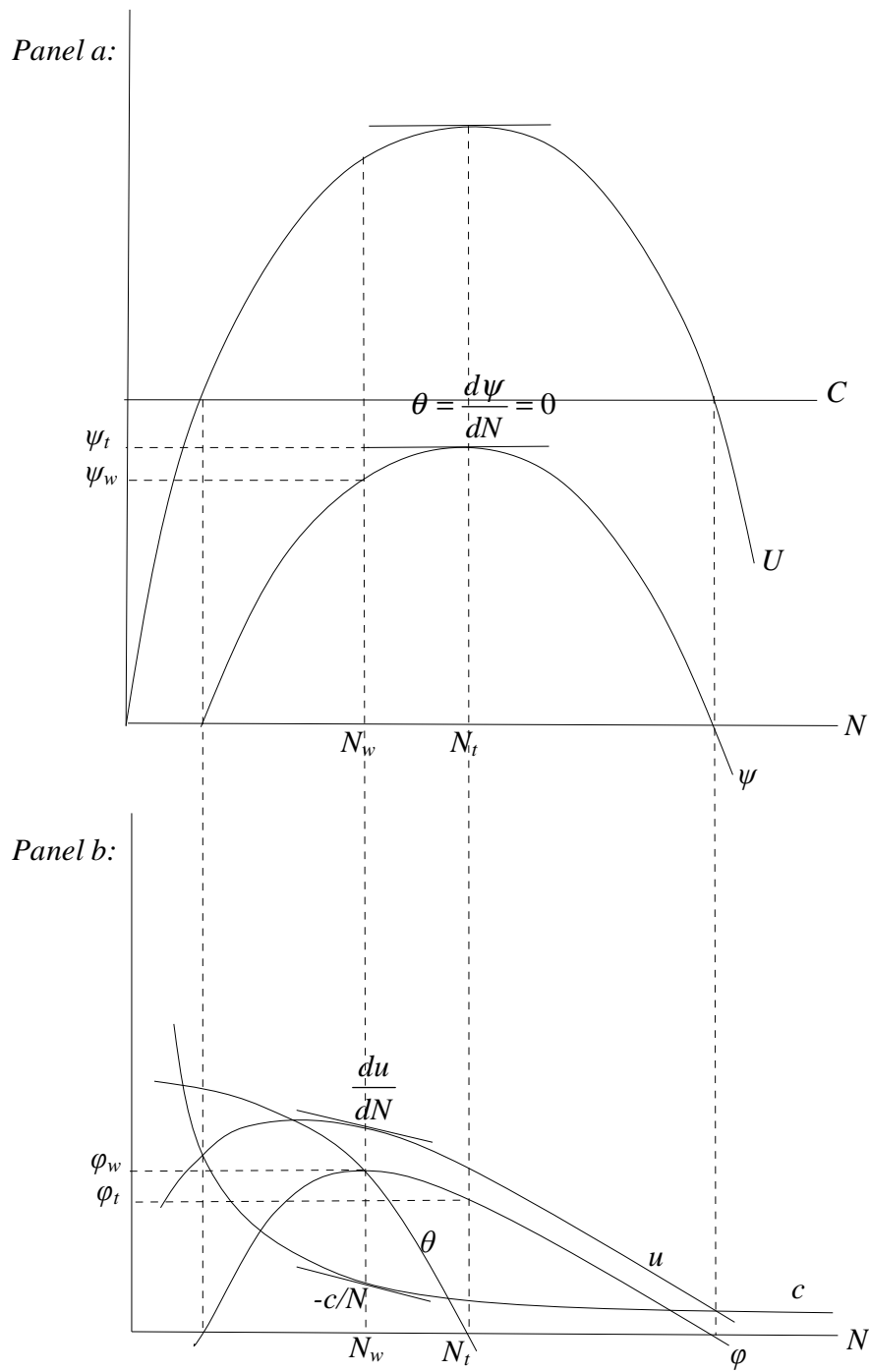


Figure 1: The basic model

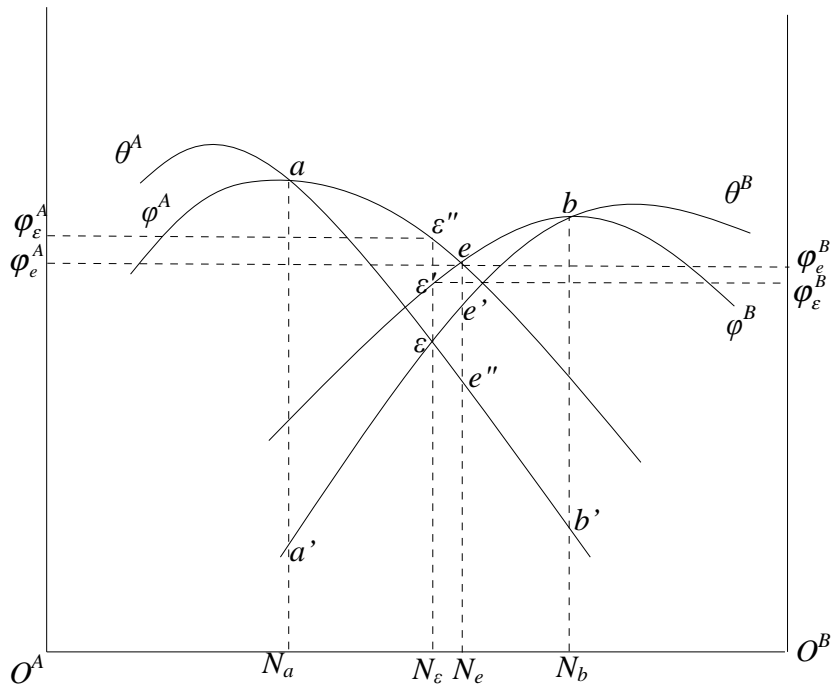


Figure 2: Optimal allocation of population between big asymmetric cities

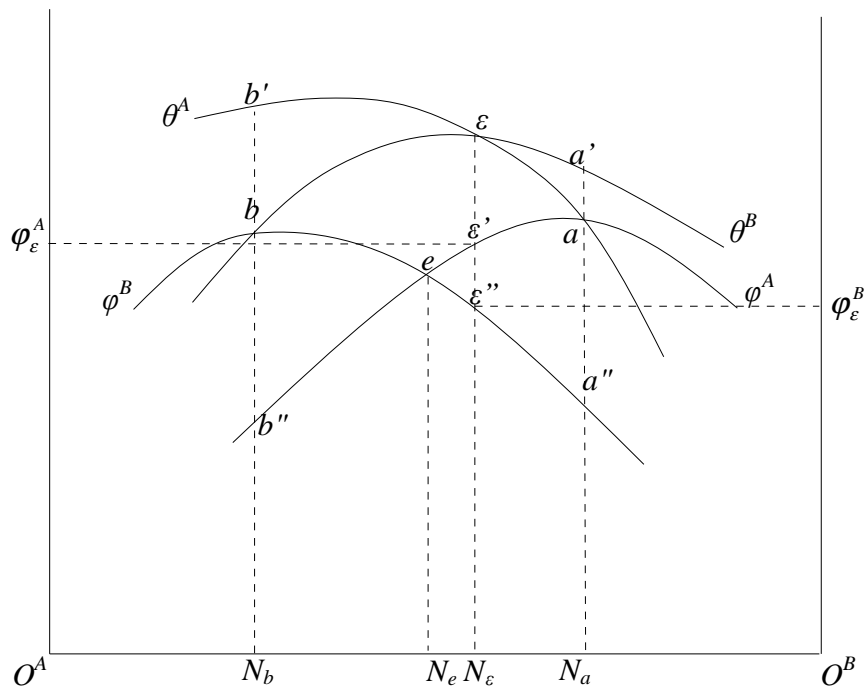


Figure 3: Optimal allocation of population between small cities

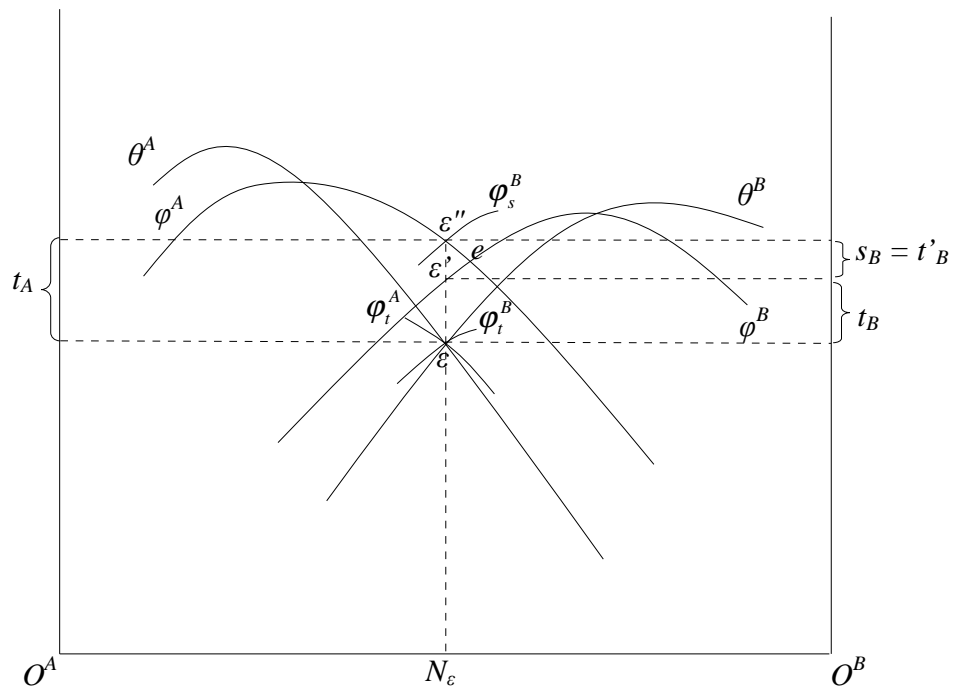


Figure 4: Local policy by the total-economy rule with big cities

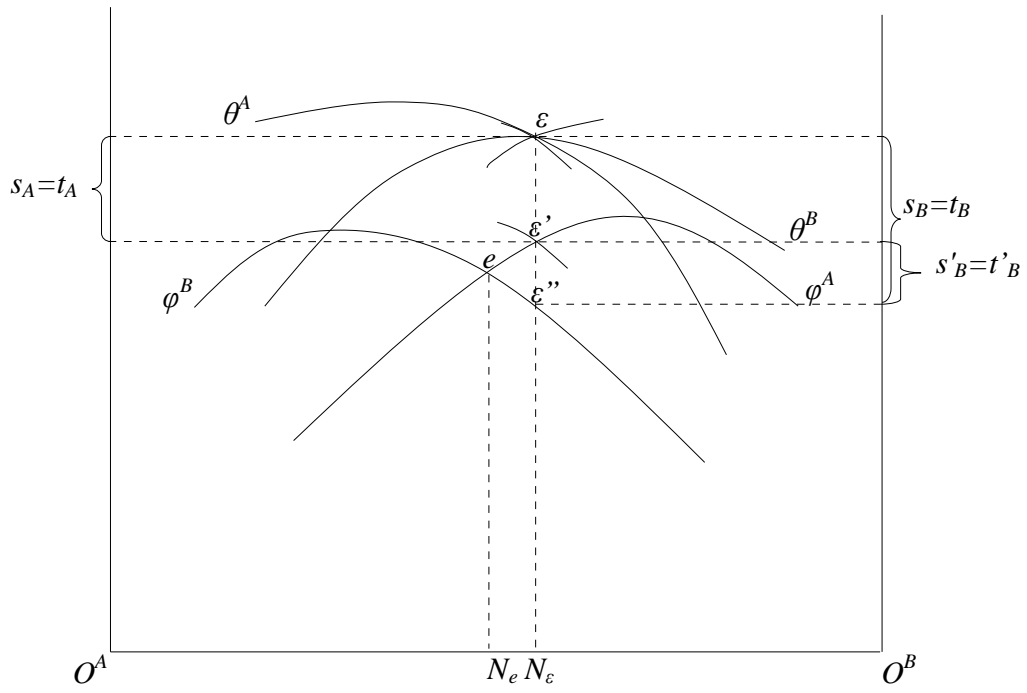


Figure 5: Local policy from the total-economy viewpoint in small cities

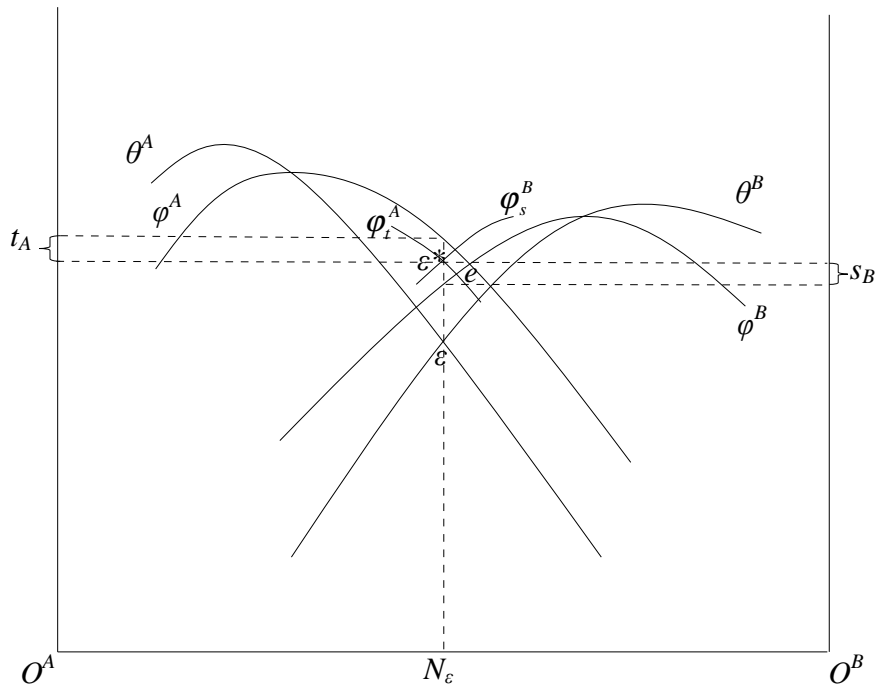


Figure 6: Centralized inter-city transfers with big cities

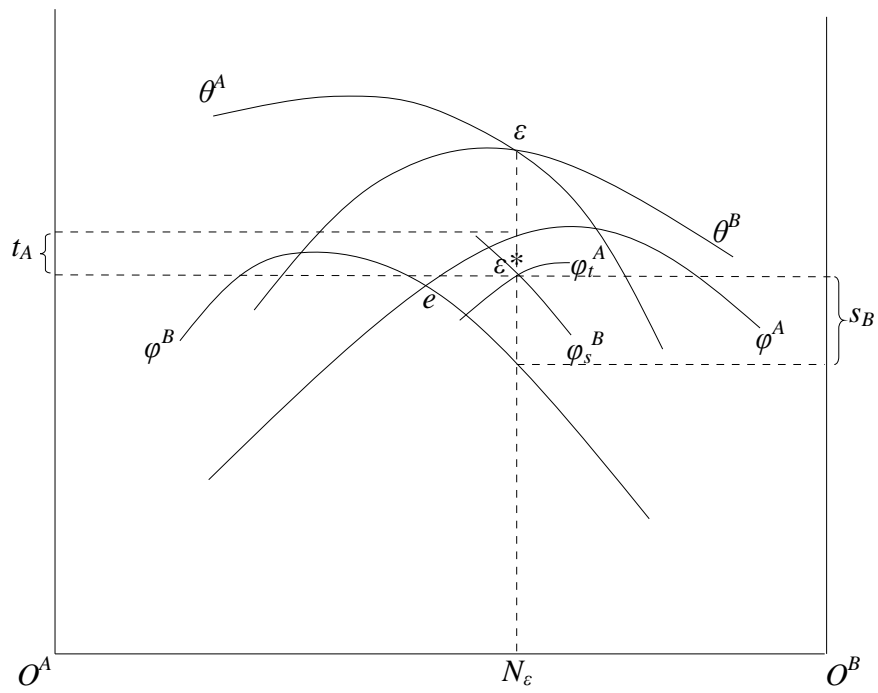


Figure 7: Ineffectiveness of inter-city transfers between small cities

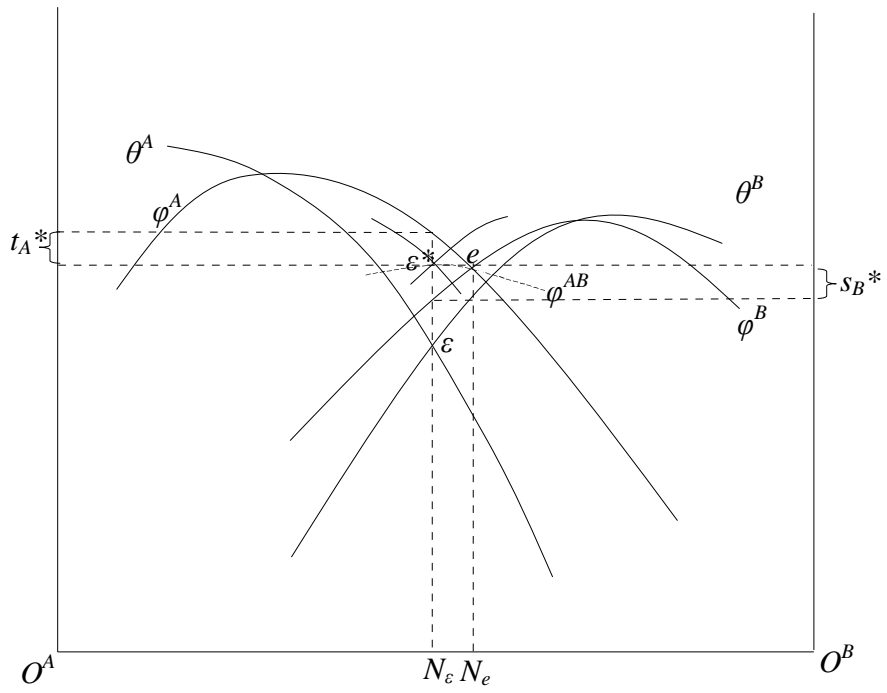


Figure 8: Consolidated policy with big cities

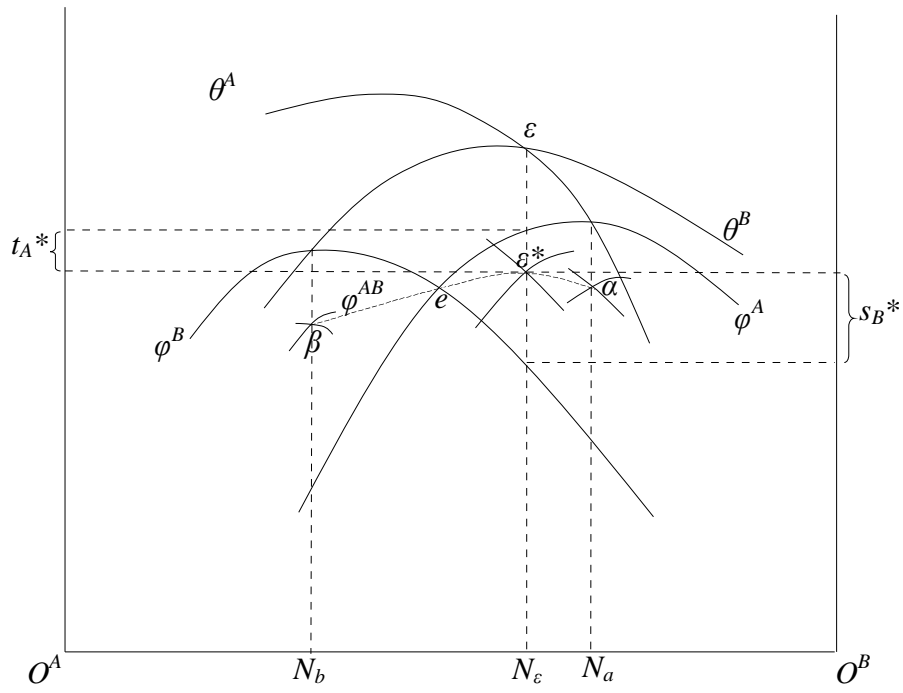


Figure 9: Consolidated policy with small cities