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5 On the Notion of Public Goods

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5.1 Introduction

One of the primary arguments for assuming an economic role by the state is that the market either fails to provide certain goods, or provides them in quantities considered socially not optimal. We denote a group of such goods by the term 'public goods'. According to the most widely used definition, public goods are goods whose consumption is free from rivalry, and non-payers cannot be excluded from consumption. Several authors find compliance with one of the above criteria a sufficient condition. Other researchers consider other factors, for example, externality or group supply, to be the crucial items in defining public goods. In this paper, I will argue that public goods are suitably defined by simply considering lack of competition, while other implications, first of all, the role of non-excludability and effects external to consumption, should be treated separately

In general, addressing terminological issues is a rewarding topic in terms of writing "studies". Nearly everything can be named, defined, interpreted, or termed in a way other than the traditional way. It is a matter of convention how one defines — to cite examples bearing on the subject at hand — externalities, public goods, pure public goods etc. The establishment of these conventions is indispensable to turn a phenomenon into a suitable subject of some scientific discussion therefore the mutual exploration of the reasons and consequences os its exsistence and the identification of the solutions to the problems arising we necessary.

We have concluded that this "common language" is not quite unambiguous as far as the term "public goods" is concerned, even though the literature on this topic includes authoritative experts like the Nobel-Prize winner R. A. Samuelson or J. M. Buchanan. It appears that the attempts at defining public goods represent a mixture of goods and the activities dedicated at the efforts to provide a supply for them, as well as various features pertaining to opportunities of market allocation, type of consumption, and also other factors. For example, while „public goods" (social goods, öffentliche Güter, Kollektivgüter) and externalities (spillover, externer Effekte, Externalitäten) are individual entries in lexicons (Eatwell et al 1991, Gabler 1993, Pearce 1993 etc.), in most works on economics their definitions overlap either partly or completely. In the definition of "public goods", differential criteria include terms such as *non-rival consumption, non-excludability, externalities, indivisibility,*

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and, occasionally, governmental supply of goods. Those sources of loss in efficiency derived from some specific attribute of the goods or activities however, will persist even if some other features turn out to lose their validity. On the other hand, economic literature often defines the notion of public goods too broadly. There are authors who even go so far as to include bread and shoes in the scope of public goods.

These actions are, of course, more indicative of their imagination than assisting in straightforward communication. What makes the situation even worse is that they appear to legitimatize the otherwise hardly unjustifiable extent of the role assumed by the state. Less than 10% of the EU governmental expenditure is spent on the supply of „real public goods" (even if this category is *interpreted broadly*). It is worth noting that the proportion of group consumption against total consumption of the population increases nominally while there is a decrease in real value. The prices of the goods and services financed by the government grow more rapidly than those of the marketable goods (Fiorito and Kollintzas 2002:5). Those on the supply side are clearly interested in having „the public state of goods" recognized, and it appears that price increasing can be realized against the state more readily than against individual buyers.

5.2 Interpretations of public goods

Theoretical discussions of the issue of public goods usually begin by paying a tribute to David Hume and Adam Smith (Cornes and Sandler 1996: 3, Johnson 1999: 83, Olson 1997: 65). Indeed, in his dissertation published in 1739, Hume tried to justify the existence of a government by emphasizing its role in providing goods (drainage of marshes, construction of dams, canals, ports, etc.), when the expenses and hardships associated with their provision can be relegated to others easily, without those evading them being excluded from their benefit (Hume 1976: 728-729). Similarly, Smith, the apostle of "laissez faire", considered the provision of supply of national defense and other public goods as duties of the government.

What does the term public goods refer to in general? Put another way, *who refers to what* when using the term "public goods"? In his frequently cited dissertation, Samuelson *never used* the term at hand (Samuelson 1954). He writes about public consumption goods, and the same term is used in his widely known dissertation published in 1955 (Samuelson 1955). He uses the term public goods as a kind of "abbreviation" in this latter work. According to his earlier writing, „collective consumption goods .... which all enjoy in common in the sense that each individual's consumption of a good leads to no subtraction from any other individual's consumption of that good..." (Samuelson 1954). Using the familiar term, this means there is no rivalry among consumers of such goods (*non-rivalrous/*

non-diminishable consumption.)[1] In their Economics issued in 1985, Samuelson and Nordhaus differentiated between „collective goods" and „public goods". The former term is reserved for goods provided collectively (i.e., by the government), while the latter indicates the extent of spillover (Samuelson and Nordhaus 1985: 714).

Spillover is better known in the literature as externalities or external effect. Also here, the question of *excluding non-paying individuals* is addressed in connection with what is called *pure public goods*: "*... a pure public good is one where the consumption is non-rival and non-excludable*". At present, some economists are clearly inclined to characterize public goods by the lack of rivalry in consumption: „Goods that do not have the second characteristic —„rivalry" in consumption – are called public goods" (Mansfield 1975: 497). Or: „public good: A good or service whose consumption by one person does not exclude consumption by others" (Schiller 1986: 65). „[Public goods are goods]... whose consumption does not include rivalry" (Blomquist and Christiansen 2002: 3). Other authors stress the non-excludability of non-paying individuals: [public] "Goods that are not excludable and, therefore, are available to everyone free charge" (Fisher 2000: 3). The principle of excludability ...„ is the criterion of differentiation between public and non-public goods" (Pearce 1993: 196). Stiglitz also considers non-excludability („undivisibility") as a main criterion, which appears to contradict his later formulation according to which „in case of some *public goods* excludability can be achieved" (Stiglitz 2000: 143, my italics).

In some other definitions the two criteria seem to be *of the same level of importance*: „Pure public goods ...are goods whose consumption is not restricted and does not reduce the quantity available for consumption, thus there is no rivalry among consumers..." (Kopányi 1993: 516). Samuelson puts this in a similar way: „...a pure public good is one where the consumption is non-rival and non-excludable" (Samuelson and Nordhaus 1985: 714). Yet there are authors who *mix* the two criteria: „A pure public good is that can be enjoyed by the individuals independently of whether they have paid for it or not" (Hyman 1989: 665). „...Public goods could not be divided among individuals, owing to non-rivalry of benefits and non-excludability problems" (Cornes 1996: 3). „The essence of the (pure) public good is that no one within the relevant group can be excluded from receiving benefits if the good is provided" (McKenzie and Tullock 1978: 24). Varian seems to point at the *external effect* as the essence of public goods: „ Public goods are a special kind of external economic effects of consumption: everyone is supposed to consume the same amount" (Varian 2001: 647). This opinion is shared by Buchanan: "a public good is an activity of significant external economic effects..."

[1] Samuelson considered it important to stress that the subject of consumption is not some kind of a mystic 'community' existing above 'individuals', rather, members in a community represent real members with consumption corresponding to their individual preferences.

(Buchanan 1992: 118). Varian includes a further attribute here: „ *supposed* to consume the same amount" (ibid. my italics).

Cornes and Sandler consider *externalities* to be not simply a source, rather, a „family of the market failures", which includes public goods as well (Cornes and Sandler 1996: 6). Musgrave defines externalities as a set of circumstances whose availability prevents market actors from providing an optimum result, while, in his opinion, public goods represent a case where in the market there is a *complete* failure (Musgrave 1959). Others formulate this as a case whereby the benefits associated with public goods completely manifest themselves as external effects. The lack of rivalry is described by some authors as a synonym of "non-exhaustibility" or "non-depletability" (Mas-Collel et al 1995: 359). Kaul has found that the majority of authors agreed on three points: first, "publicness" is not an inherent characteristic of a good, rather, it is a matter of political choice. Second, a public good is not necessarily beneficial to all members of a community. Third, public goods do not necessarily have to be provided by the state (Kaul 2001: 259).

According to the most widely accepted current position, goods can be classified into different qualitative and quantitative *groups* of publicness (Hjerppe 1997: 14-15):

(a) *private goods* and, - at least, theoretically -
(b) *pure public goods* (characterized by non-rivalry and non-excludability of non-payers),
(c) *quasi-public goods* (semipublic goods or mixed goods (whose excludability is possible but *not reasonable* due to positive external effects, as the benefits associated with the good are not equally divided among consumers,
(d) *merit goods* (of which the consumers consume less than their needs would justify, owing to their lack of information or „inappropriate" preferences).

Thus, the definition of „quasi-public goods" or „mixed goods" is also done using the categories of rivalry and excludability: non-payers can be excluded despite a lack of rivalry. According to a different definition „mixed good" is one where „consumption is not completely competitive" (Pearce 1993: 457). According to a third approach, partly competitive and partly „excludable" goods belong to this category (Smart 2002). A fourth approach claims that external effect is exerted by goods that are neither purely private, nor purely public (Hallgren and McAdams 1995: 1). Sometimes, on the basis of collective *supply*, merit goods are classified as a group of public goods. In an extreme „supply-side" approach, „publicness" itself can be traced back to collective (governmental) supply. A clearer but nevertheless problematic classification considers categories of rivalry and excludability only (Table 5.1).

From the public goods mentioned in the table, national defense and (for example, scientific) information are usually referred to as „pure public goods", while congested and uncongested roads that can, in theory, be provided also by the market,

belong to the category of „quasi public goods". Scientific literature interprets natural monopolies in a different way.[2] Although the supply of public goods (that is to say, the technology applied in the course of their production) can be characterized by natural monopoly (economies of scale), the two are in fact different. The goods mentioned in the table are often referred to as public enterprise goods [3].

Table 5.1 Categories of rivalry and excludability

	Rivalry exists	**Rivalry is missing**
Excludability is possible	Private goods • ice-cream • clothing • congested toll roads	Natural monopolies • fire-service • cable TV • uncongested toll roads
Excludability not possible	Common resources • fish in the ocean • natural environment • congested non-toll roads	Public goods • national defense • information • uncongested non-toll roads

While admitting a certain freedom in assigning names to goods and groups of goods, it appears useful to differentiate the implications concerned for each, namely:
(a) non-rivalry,
(b) non-excludability of the non-payers,
(c) externalities,
(d) indivisibility[4],
(e) natural monopoly,
(f) collective supply due to „inappropriate" preferences,
(g) collective supply due to other reasons.

We find these distinctions to be of utmost importance, on the one hand, for the identification of possible losses in allocation-related efficiency and, on the other hand, for choosing the appropriate method of treating the given inadequacy of the market. Thirdly, it is important in order to make *sure we know what we are talking about*.

[2] It is usually taken to mean the monopoly position created by satisfiable demand coupled with decreasing general expenses (Samuelson and Nordhaus 1985: 506); it also refers to cases when monopoly position is connected with the monopoly possession of some natural resource (for example, a mine or a spring) (Gabler 1993: 23-65).
[3] It should be noted that despite the repeated accusations of the market in connection with insufficient supply of this group of goods this group of goods, there is ample evidence indicating that their public supply — adjusting itself to particular interests, is *excessive*, as a rule.
[4] Cornes means „non-rivalry" when speaking about „indivisibility": „..the expressions *non-rivalry of consumption and indivisibility of benefits* are used interchangeably" (Cornes and Sandler 1996: 8).

5.3 The definition of public goods

„Public goods" are first of all *products* or *services* (hereinafter referred to as 'goods'). They are goods whose „consumption" does not decrease the quantity of the good available to others. Differently put, consuming one unit of the good does not prevent others from consuming the same unit of the good (non-rivalry). Let us mark the supplied quantity of some good by X, then the consumption probability for any n will be $X_i = X$ (i = 1, ..., n) for the i^{th} consumer. Supposing we have a utility function differentiable twice *U=f(X,Y)*, it is obvious that a relation $\partial U_i/\partial X > 0$ will hold before a satiation point. Of course, this would entail a zero *production* marginal cost.[5] While we will maintain the above assumptions, we must stress the importance of the results according to which the most frequently cited "public goods" — occasionally „pure public goods" — like national defense or legislation do not *meet* this requirement perfectly must be stressed. The expenditures connected to the above-mentioned „public goods" are simply proportionate with the population, providing that similar incomes are earned (Holcombe 1998). Although the marginal cost of a new consumer is low (similarly to that of providing bread for another citizen), but *not zero*. Thus, the optimum condition -ΣMRS = MRT formulated by Samuelson does not hold any longer.

According to Varian: „everybody *must* consume the same quantity". In fact, the same of amount of public goods, in the extreme, is *at anyone's disposal*, but it rarely means obligatory or real consumption. In the case of public supply, one of the most frequent sources of allocation failure is related to the assumption of identity of consumption and supply. The government is inclined to mix up input and output anyway (for example, the responsibility for education being mixed up with the budget of the sector). In addition, the supply of public goods may be "assisted" by the fact that the beneficiaries of the orders placed by the government are interested in exaggerating the number of those consuming the goods and services, or the benefit derived therefrom. There are goods consumed by individuals under compulsion (these are mostly „public bads" like air pollution). The consumption level of most of the public goods can, however, differ from one individual to another. A possible distinction may be drawn on the basis of differentiating between goods whose benefit comes from their use, and those whose benefit originates from their *existence* (that is, use and non-use benefits). The existence of a church-clock allows any passer-by to learn the time, and that is a kind of benefit coming from the *existence* of this object. Actually watching how time goes by means realizing *different* kind of benefit. Similarly, one does not need to visit tropical forests regularly in order to enjoy the benefit originating from their existence, whereas visiting them on a regular basis may result in a different kind of benefit.

[5] The marginal social cost related to the inclusion of a new individual into consumption may nevertheless be positive, as a result of occasional negative external effects.

The fact that the consumption of some public good does not decrease the stock at others' disposal does not mean that the marginal utility of the given good is zero for all the consumers on the socially optimal consumption level, that is, public goods must not be confused with "free goods" either!

Further, the fact that the consumption of a good does not decrease the stock at others' disposal does not exclude the chances of increasing or decreasing the profit earning possibilities of the others. Anyone's consumption can result in externalities, which does not, in our view, affect the essence of public goods. This question will be discussed later on anyway because, as noted earlier, public goods — according to some researchers — are extreme cases of (positive) externalities, while (negative) externalities, others say, diminish the public character of goods.

5.4 Non-excludability

It appears that unnecessary, restricting and misleading criteria should be eliminated from definitions of public goods. In addition to presuming an external effect, reference to the non-excludability of non-payers should also be considered as a "restricting criterion". We have a totally different dimension here. There is perhaps no point in referring to the vagueness of the assumption that „*no one* can be excluded from consumption" (Kopányi 1993: 516; my italics), since a significant portion of individuals are, or can be, excluded from the consumption of a high number of goods which does not in itself change the very character of the goods concerned. The deaf are „excluded" from enjoying a piece of music to an extent comparable to that of the (more or less) uninitiated. The group that is relevant in terms of excludability is obviously just that of the non-payers. And even that group is relevant only if supply of the goods concerned is expected to be realized by the market.

Excludability of non-payers is an indispensable precondition for the *market* supply of goods and services, but it is not this condition that is to turn some of the goods into public goods. Non-excludability of non-payers would damage the market supply of not just the public goods but also that of those private goods and services that are considered classical. On the other hand, while there is practically no good from whose consumption non-payers could be completely excluded, there are actually no goods whose consumption could be *technically* excluded from access by non-payers. When allocating market goods, the problem of excluding non-payers (also) arises.

Exclusion is (also) expensive in the case of any market good (just think of computer software that is considered, on the basis of non-rivalry, a kind of public good, yet it is offered to us by the market, notwithstanding the fact that preventing their illegal copying is extremely difficult). The "costs of exclusion" are sometimes very low in comparison with the value of some good, therefore they do not

(significantly) affect the allocation of production resources, at other times, however, they may be significant. *These latter goods are called „non-excludable" goods*. That is, it "simply" means that the expenses of exclusion would entail *too high* a sacrifice in some cases. If we take into account the costs of exclusion, the supply costs of the good at hand might even exceed the profit expected from future consumption (such as „consumption" of the network of public roads or that of the traditional bell chime at midday). These costs move the supply curve of the good upwards (to the left), thereby setting the quantity needed for market balance at a lower level. In such an event, we must consider alternative allocation mechanisms as well: whether the potential „profit" between the reservation price (more precisely, the marginal evaluation) and the par excellence production costs could be attained by way of some coordination that would not entail the exclusion of non-payers and thus not incur the costs of exclusion.

Those who tend to view the market economy as a single possible (relevant) allocation mechanism may be inclined to regard the costs of exclusion as a kind of „production" price, as those are in fact the operating costs of a market economy, thus, in essence, they do not differ from the costs of employing a salary accountant at a company or a movie-cashier. This reasoning however, fails when one considers the alternative coordination mechanisms. As far as the alternative coordination mechanisms (for example, the role of state) are concerned, other related transaction costs should also be included, for example, those connected to tax collection, inefficient budget allocation, or the effect of taxes slowing down production or distorting allocation (Stiglitz 2000: 164).[6] On the other hand, it is important to separate the costs of exclusion from those of production in the strict sense, even if one adopts the „almightiness" of market allocation. The procedures of exclusion (from the field-guard through the electronic signal systems applied in stores to the satellite encoding of television broadcasts) represent, or should represent, an *independent area* of the attempts aimed at cost reduction.

The issue of excluding non-payers is in fact connected to a number of public goods as well. The exclusion of non-payers *does not solve* the „issue of public goods", as it has not been caused by its unfeasibility or high expenses: non-rivalry and non-excludability are not necessarily concomitant. If non-payers can be excluded from consumption (it should be evident from what has been said before that their non-excludability is not regarded as an attribute of public goods), then the market is capable of supplying the public goods concerned (see, for example, the software market). In this case, the problem of allocation is associated with *pricing* that regulates access. This pricing *cannot*, in Pareto terms, be efficient, since any positive price excludes potential buyers with lower reserve prices from

[6] Stiglitz suggests to change Samuelson's optimum-condition "marginal physical rate of transformation = marginal rate of substitution" to „marginal economic rate of transformation = marginal rate of substitution", as the latter also includes the extra costs of financing obtained from taxes (Stiglitz 2000: 164).

consumption, while the marginal cost of their supply with the given good – in absence of externalities – would be zero.[7] The exclusion of the latter from the benefit of public goods would result in a loss of social efficiency. If unrestricted numbers of new individuals can join the consumption of some good (light-house, tower-clock, information, etc.) with a zero marginal cost, then all demands with a positive marginal estimation have to be met at an efficient level of consumption. That is why it is "dangerous" to expect that the development of excludability technologies will eliminate the problem of public goods.

Non-excludability is not a property of the good at hand, rather, it is a problem associated with the allocation system. This problem does not occur at all in non-market coordinating mechanisms, while the Samuelson condition of optimal production volume is independent from the mechanism of allocation. Identifying marginal estimations is an important *task* in all coordination mechanisms, including bureaucracy! The market mechanism is however, not the only means of identification. For example, household activities are subject to cost-profit calculations similar to shopping on the market.

Samuelson's original definition was allegedly "improved upon" by Buchanan introducing the criterion of non-excludability (Eloranta 2001: 2); however, Buchanan did not argue for the non-excludability of non-payers (op. cit.), rather, he points out the irrationality of their exclusion: „Once produced, it will not be efficient to exclude any person from the enjoyment... of its availability. (...) Additional consumers may be added at zero marginal cost" (Buchanan 1968). That is, once the good has been made available, exclusion of anyone from consumption would be inefficient since a new individual can join earlier customers at zero cost. „...No one *need* be excluded from consuming it", as repeated elsewhere (Albert and Hahnel 2002, my italics).

Of course, a distinction must be drawn here between two things. The par excellence production costs of a good may be lower than the increase in well-being expected from the good. At the same time, this relation may turn out to the opposite if the costs of exclusion are considered. Yet, this will *not turn the good in question into a public good* (cf. Kaul 2001: 257). In this case, the primary task is to create a more efficient "technique of exclusion" in order to allow the low cost of exclusion to provide for market supply, on the one hand, and to decrease the cost of market coordination, on the other. If such a technique is not available at the moment then, of course, resorting to an allocation mechanism that does not exclude non-payers may be considered. In the case of public goods however, there may be inexpensive and applicable techniques of exclusion, *nevertheless*, deploying exclusion would result in losses.

[7] It should be noted that market pricing would only be socially optimal even in the case of „pure private goods" if the system of proprietary rights worked smoothly and free of costs.

5.5 Externalities

As mentioned above, many view „public goods" (Buchanan, Varian, Cornes and Sandler) as a special or common form of externality. I argue that the phenomena mentioned should be distinguished from each other. Consumption of a person *j* can, of course, affect the well-being of person *i* ($j \neq i$) in various ways: $\partial U_i/\partial X_j$ can be zero, a negative or a positive number. $\partial U_i/\partial X_j < 0$ means that the consumption of the given good has a negative external effect. This is a typical feature of goods that are *likely to have congestion effects*. While drivers joining early morning traffic do not actually decrease the increase in well-being of other individuals using the roads, that is not the case during the „morning rush hour". A newly joining driver can increase the overall driving time of the others by hours.

The well-known snob-effect can have similar consequences: the increase in the number of consumers at a once-famous holiday resort does not necessarily entail crowdedness, but it certainly does decrease the „exclusivity-value" of that place. The $\partial U_i/\partial X_j > 0$ case also appears realistic: the enjoyment value of some goods, (say, a football) will increase in parallel with the number of consumers up to a certain number. A „bandwagon effect" may also result in a positive external effect: a (different) resort, say, becomes fashionable and more attractive. The term positive congestion externality may not be the best one to denote a case whereby a good or service is more valuable if a higher number of individuals buy it (telephone, e-mail network, match-making service, etc.). I have already stressed that it is not the external effect that makes some good a public one. The *consumption* or *production* of a (public or private) good may have an external effect, while "publicness" is an attribute of the good itself. A match-making service is a public good, its consumption has a positive external effect. Externalities and public goods are *two types* of market failure (Mas-Collel et al 1995: 350). Whether the private *supply* of public goods has occasional positive external effects on the other consumers of the given good is a different issue.

In my interpretation, an external effect is a well-being effect of some economic (production or consumption) *activity* which the decision-maker ignores in making his decision about the given activity (Mozsár 2000). Contrary to definitions commonly found in the literature, „taking into consideration" does not necessarily pre-suppose a *market* transaction. Likewise, Buchanan excludes from the group of externalities those activities which „affect the utility of the individuals within their direct (family) environment" (Buchanan 1992: 118). Market set-off is but *one of the possible ways* to make a decision-maker take the change in others' well-being into consideration. An external effect is not the result of the effect of some individual's activities on others' well-being (as this is one of the most common phenomena of living in a society), rather, it results from mediation of the change in well-being to a decision-maker, in particular, its inclusion in the parameters of decision-making.

That is why Buchanan's definition fails: „Externalities occur if the definition of $u^A = u^A (X_1, X_2, ...X_m, Y_1)$ is valid. This means that the utility of an individual A depends on the „activities" of ($X_1, X_2 ..., X_m$) under his exclusive control, and also on a different activity Y_1 that is, by definition, within the scope of control of individual B" (Buchanan 1992: 102). Providing that everyone revealed his or her margin estimation function related to some public good in an exact manner, all the (social) expenses of its production were known, and the decision concerning the supply of the good were made by taking all this into consideration, then there would be *no externalities,* no matter what medium (compensation, penalty, empathy, compulsion, etc.) would mediate the changes in well-being to the decision-maker. Here, the point is rather related to the fact that the focus is on *activity* in the case of externalities (or, maybe, on the *decision* pertaining to the activity), whereas the characteristics of public good (service) relate to the *public good itself*. Meade identifies an „event" as the source of externalities. Yet, in his specification, Meade focuses on the effects not included in the *decision* triggering the event (Cornes and Sandler 1996: 39). The consumption of any private good may involve (positive and/or negative) externalities, and the consumption of some public good may take place with no externalities at all.

Let X denote the *available quantity* (supply) of public goods (with Y_i , Z_i , etc. marking the quantity of private goods consumed by the *i*-th individual, then the relation $U_i = f_i (X, Y_i, Z_i ....)$ holds, whereas $U_j = f_j(X, Y_j, Z_j \ldots)$, and $i \neq j$. This means that the total amount of public goods are present in the utility function of all the community members *involved* : $X = X_1 = X_2 = ... = X_n$. The utility of the public goods is evaluated by the community members depending on their preferences, which can of course produce a zero or even a negative result in some cases. An external effect, on the other hand, means that the *production* or, in our case, the *consumption* of the good (i.e., some *activity*) also influences the well-being of some individual other than the *private* consumer (producer), but without any feedback! Remaining within the area of consumption presuming that the consumption of some public good X involves (mutual) externalities, the utility function of the *i*–th individual will be $U_i = f_i(X_i , X_j, Y_i , Z_i ....)$, then that of the *j*-th individual will be $U_j = f_j (X_j , X_i , Y_j , Z_j ...)$, where $i \neq j$. In the case of $\partial U_j / \partial X_i > 0$, the externalities of the consumption of a public good are positive, while in the event of $\partial U_j / \partial X_i < 0$, they are negative. Of course, $\partial U_j / \partial Y_i > 0$ or $\partial U_j / \partial Y_i < 0$ are also possible, that is, consumption of some private good can also have negative or positive externalities.

Buchanan defined X_i of utility function U_j as the „uncontrolled" *activity* of the *j*-th individual. His examples – *eating* bread, *drinking* milk and *emitting* smoke, (my italics) — refer to the same entity (Buchanan 1992: 102). It is more surprising that the same study uses a good (a fence) to illustrate the source of externalities. The contradictory nature of this fence as a public good (which, in our example, at some height is „public wrong") is obvious from the fact that Buchanan replaces it on

several occasions with the fence-building *activity* of individual B constructing the fence, in speaking about the „scope of *activity*". In one of his main works, the action of mosquito repelling is used as a public good (Buchanan 1968). The high-standard microeconomic theory expressly and consistently identifies *action* as the source of externalities, warning against the danger of efficiency loss associated with the replacement of action with its product or means in the course of internalization (Mas-Collel at al 1995: 352-359).

Our examples, similarly to those cited in the literature, suggest that externalities are *exceptional* concomitant phenomena related to *individual* actions of production or consumption and, as such, can be handled with *exceptional procedures* (direct state regulation of the level of source actions of externalities, Pigou-type taxes and subsidies, etc.). This appears to be a fatal misunderstanding. In fact, it is hard to mention a production or consumption action to which no — I would even go as far as to say, either positive or negative — externalities can be assigned. The phenomenon of externality is *as frequent as economic activity itself* (Albert and Hahnel 2002: 4). Quoting Hayek: „... the totality of the resources that can be.... utilized in a project *simply cannot be known by anyone*, therefore it can be hardly regulated centrally" (Hayek 1992: 93). The only way to handle externalities globally is, therefore, possible within a decentralized mechanism; that is, the *market* must be enabled to do away with the externalities.[8] The same is probably true for public goods as well. It is not the aim of the present paper to examine alternative opportunities of the supply of public goods. It should be nevertheless added that if the state could provide the supply of public goods at an efficient level, we would have no grounds whatever to state it could not do the same in the case of private goods. And that is what the example of „planned economies" clearly suggests!

5.6 „Pure" public goods

Although in defining public goods there is often only reference to non-rivalry, „pure public goods" are nearly always defined in terms of two criteria: non-rivalry *and* non-excludability of non-payers. However, similar to reserving „pure monopoly" to refer to *monopolistic position* or „pure competition" to describe an extreme type of competition (non-replaceable goods, an endless number of similar participants), the expression of „pure public goods" should likewise be used to describe extreme types of public goods, rather than apply it to goods *also* having some other property (like, for example, non-excludability of non-payers). And if public goods are simply goods whose consumption is not linked to any rivalry (Mansfield 1975: 497), then a polar case may obviously refer to goods whose consumption is *not linked to rivalry*

[8] Not excluding, of course, the possibility of extremely important or urgent cases where direct interference by the state may be justified.

at all — any number of consumers can join in their consumption. „...Goods for which there is no depletability whatsoever are sometimes referred to as *pure* public goods." (Mas-Collel et al 1995: 360). [A pure public good is…] a good or a service that is (1) consumed by multiple people and (2) whose use by anyone does not decrease the amount left available to others" (Hackett 1998).

This does not mean that individual consumption of some pure public good cannot decrease the potential (that is, not the amount available) of profit-making oppurtinities relating to the given good. In other words, $\partial U_j / \partial X_i \geq 0$ is not arbitrary for any number of consumers.[9] Over a critical number of consumers, a congestion phenomenon would naturally occur. This, however, has to do with the problem of externalities. Perhaps we should return to Samuelson's original definition: „goods of collective consumption". In my view, the exclusion of the negative externalities from the „pure case" would render the idea of „pure public good" practically useless and empty the set of pure public goods. I wonder whether I will drift apart from the ideal type of public good if (being envious) I am disturbed by the fact that people I do not like can also enjoy world peace? This would not make much sense.

There are several arguments that can be mentioned in support of the double definition of pure public goods, although neither of them is sufficiently significant to justify its adoption. The fact that Samuelson defined pure public goods (*also*) using the double criterion is obviously not a satisfactory argument, nor is concomitance of the two characteristics, or the fact that either can support the idea of a governmental role? (Bucovetsky 2001: 3). The „problem of public goods" indicates that the market is incapable of providing an efficient supply of the goods, even if the supply is profitable. Excludability, on the other hand, means that either the market is completely incapable of providing the supply of the goods, or the cost of coordination is „unpleasantly high". The problem of externalities and monopolies can be treated separately from both, although the latter results again in a socially non-efficient level of supply.

A number of researchers share the opinion that there are no pure public goods at all. While there are so-called club goods, local public goods, the externalities accompanying the local supply of public goods, etc., but the existence of „pure public goods" is only a theoretical consideration. A lot of papers define public goods, and even *pure public goods,* as goods accessible to the *relevant group*. This appears a reasonable restriction. A „relevant group" can be expanded without limitation (mankind itself could be mentioned here in its relation to rainforests or world peace), on the other hand, it helps us to avoid the nearly complete emptying of the category of public goods. Thirdly, the negative externality of congestion increase can be separated from the problem of public goods. There is no point in studying a

[9] We will disregard the distinction between Buchanan's marginal and infra-marginal externalities for the time being. In our present approach, only *marginal* externalities are considered (Buchanan 1992: 103, Pearce 1993: 457).

group of goods which cannot include any existing good. In addition, this reasoning diverts attention from studying the nature and supply conditions of the goods that are far from being "theoretically pure" cases but are fully suitable *in practical terms*. McKenzie and Tullock also write about a „relevant group": „The essence of the (pure) public good is that no one within the relevant group can be excluded from receiving benefits if the good is provided" (McKenzie and Tullock 1978: 24). Of course, we do not agree with the formulation „can be excluded", as mentioned above. Excludability from consumption, in our opinion, does not eliminate the public-good feature of the goods.

Nearly all researchers mention *national defense* as the ideal type of public goods. However, it is evident that the benefits of "national defense services" can only be enjoyed by members of the nation ("the relevant group"), thus the criterion of non-rivalry plays but a limited role here. Furthermore, the defense of a nation (country) as such is a highly complex and heterogeneous service. Supposedly, the capital is always better defended than most of the countryside, „high ranking" people are better protected than the others, the ones provided with chemical equipment enjoy a better protection compared to those lacking it, etc.

5.7 The problem of public good

An entrepreneur has a double function in market economy: he is an *innovator* and also a *producer* (*service provider*). As an innovator, he has to identify the needs whose satisfaction requires less social sacrifice compared to the increase in well-being, (that is: the net welfare change – (the figure of profit + consumer surplus) = is positive). In addition, he is required to find increasingly efficient ways of meeting the needs. A further innovative function of his is to find the way of organizing consumers and getting his activity financed in such a way as to provide compensation for the sacrifices he makes in order to meet market demand and, occasionally, produce economic profit. Lastly, as a producer, he has to organize the process as a whole. „Identification" and „supply" are tasks of equal importance. The same is true for private goods: both represent part of an entrepreneur's function, and failure to meet either of them entails a loss in efficiency. The problem of public goods is not a market failure, rather it has to do with the momentary inability of an entrepreneur to identify and supply the public goods concerned. Members of the society will either (a) have to improve their entrepreneurial activity so that it includes public goods, or (b) replace it with a new allocation mechanism, for example, the government.

Yet, all Pareto-inefficiencies boil down to potential profit. If indivisibility of goods, asymmetric information, externalities, attributes of public good or anything else prevent market allocation of resources in a the Pareto-efficient way, then it is the entrepreneur who can realize profits from solving the problem. He provides

temporary lending opportunities to overcome the problem of indivisibility, pays the expenses connected to obtaining information, initiates legal actions to realize compensation for the individually low yield obtained through negative externalities, etc. The problem of public goods, as stated above, is not a failure of the market. Similar to a lack of a really efficient method to treat cancer.

A future producer of some public good can exclude all consumers from consumption by not producing anything. He can receive advance payments from consumers prior to commencing production, but there will be at least a few potential consumers who will conceal their preferences (free riding). The same is the situation with private goods. The only difference is that there is a *large number* of consumers involved when an entrepreneur is engaged in public goods. He is interested in promoting consumers to get organized, assisting them in solving problems pertaining to concealing their preferences, effecting complicated and expensive bargaining (hard bargaining), and resolving problems connected to financial control.

If a government (an agent, a politician or a bureaucrat) supplies the public good, his action is also considered a public good. The selection of an „agent", making him work for the public, and controlling him are also public goods, therefore the number of problems does not necessarily decrease as a result of this „solution". It is always easier to organize a smaller group to tap the tax collected than to have the tax-payers or consumers to prevent this. This is the reason why particular interests so often receive legal support.

Radio broadcast is a public good as there is non-rivalry in its consumption. *In addition*, non-payers are not excluded from its consumption either. Whichever way we define pure public goods, radio broadcast will always be assigned to them. And it is the market that supplies this kind of good. Of course, there is no evidence confirming the efficiency (high level) of this supply, as is also the case in "state-run" (i.e., financed from tax paying) public channels. The public ownership of a channel, in my opinion, is simply a manifestation of the enforcement of the interests of some group(s) in the society. Undoubtedly, there is a demand for „high culture" and „deep ideas". Why are they not (necessarily) supplied by commercial channels? *Because they are too expensive for the consumers!* Of course, this statement requires an explanation. As pointed out in another context, consumers almost never consume some good in itself; rather, they consume *combinations of goods*. Consumption of „high level culture" requires prior educational „investments", more or less mental effort, and usually more time. In the event of some radio broadcast, this also involves a receiver, some electric energy, although these latter items may be seen as insignificant factors.

5.8 Summary

We propose to simply define public goods as goods whose consumption by some individual *does not entail a reduction in the set left available to the other individuals*. In other words, inclusion of further individuals in the consumption of the good at hand incurs zero *production* marginal costs. Extra production costs are pointed out here deliberately. Of course, negative external effects can entail additional social costs. This definition – in the strict sense – also entails ”pure” public goods. The related problem may relate – in case of market coordination – to a positive price of the goods as required by the market.

The possible tendency to develop congestion can be handled as an externalities issue, it does not have to do with the public good status of the goods concerned. It may, at the same time, justify positive prices. Inclusion in consumption, in the optimum case, may be identical, in this case and given the currently available demand, with the *sum* of the loss in utility deriving from the congestion increase pertaining to earlier consumers, while a supply optimum can be established on the basis of an equation determined using production marginal costs and, conversely, the decrease in congestion, and the extra profit attained by additional consumers. A possible positive external effect associated with consumption can be handled – mutatis mutandis – in an identical manner.

The „problem of exclusion” is a *technical (and costs-related) issue* that relates to all the goods offered by the market. Perhaps more intuition is needed in the case of public goods in order to identify the appropriate (cost-effective, market supply friendly) techniques of exclusion (such as, for example, the encoding of satellite television broadcasting), nevertheless, this should not affect the public good versus private good status of goods.

The state (communities) may perhaps have four reasons to interfere with spontaneous economic processes (allocation of resources) by reference to public goods:

(a) If consumption of some public good does not entail a negative external effect, its optimum price will be zero. Obviously, the market will not be able to produce the good concerned at a zero price if that would increase social well-being. In such a case, the state can function as a principal.
(b) If the state supplies (orders, procures) the public good, and the consumption thereof has a *negative* external effect, then a pricing system is to be established (or the market is to be assisted in establishing such a price) that takes into consideration both the increase in the well-being of the additional consumers and the aggregated decrease in the well-being of the earlier consumers.
(c) If the state supplies the public good and the consumption thereof has a *positive* external effect, then it has to implement a *support* system (the market is to be assisted in establishing such a system) that takes into consideration both the

increase in the well-being of the additional consumers and the aggregated increase in the well-being of the earlier consumers.

(d) Finally, in the event that the costs of exclusion of non-payers would lead to market dysfunction, the state can play the role of principal and — what appears to be the more favourable path — support the implementation of more cost-saving exclusion techniques.

In my opinion, partial study may not merely contribute to understanding multi-variate functions, a typical feature in economics. It may be equally suitable for the exploration of issues related to the *individual* properties of goods and identifying the opportunities available to the solution of these issues. This paper is intended to draw attention to this aspect of research into economics.

References

Albert, M. and Hahnel, R. 2002: *A Quiet Revolution in Welfare Economics. Externalities and Public Goods.* http://www.zmag.org/books/3./3.htm

Blomquist, S and Christiansen, V. 2002: *The Role of Prices on Excludable Public Goods.* http://www.nek.uu.se/Pdf/2001wp14.pdf

Buchanan, J. M. 1968: *The Demand and Supply of Public Goods.* http://www.econlib.org/library/Buchanan/buchCv5c0.html

Buchanan, J. M. 1992: *Piac, állam, alkotmányosság.* Közgazdasági és Jogi Könyvkiadó, Budapest.

Bucovetsky, S. 2001: *Pure Public Goods: Definitions and Examples.* http://dept.econ.yorku.ca/~sam/4080/pubgoods1.html

Coase, R. 1974: The Lighthouse in Economics. *Journal of Law and Economics,* 17 (October): 357-376

Cornes, R. and Sandler, T. 1996: *The Theory of Externalities, Public Goods and Club Goods.* Cambridge University Press, Cambridge.

Cremer, H. and Laffont, J-J. 2002: Public goods with costly access. *Journal of Public Economics* (forthcoming)

Eatwell, J., Milgate, M. and Newman, P. 1991: *The New Palgrave: A Dictionary of Economics.* The Macmillan Press Limited, London.

Eloranta, J. 2001: *Opportunities and Constraints int the Game for Public Goods.* http://www.cc.jyu.fi/~pete/SWEFINCOMPARISON.pdf

Fiorito, R. and Kollintzas, T. 2002: *Public goods, merit goods, and the relation between private and government consumption.* http://www/econ-pol.unisi.it/quaderni/363.pdf

Fisher, E. 2000: *Public Good and Common Resources.* http://economics.sbsohio-state.edu/efisher/econ200/Chapter11_files/frame.htm

Gabler 1993: *Gabler Wirtschafts Lexikon.* Gabler Verlag, Wiesbaden.

Hackett, S.C. 1998: *Enviromental and Natural Resources Economics (Chapter 5).* Published by M. E Sharp http://dwp.bigplanet.com/dickallen/glossaryofterms2/

Hallgren, M. and McAdams, A. 1995: *A Model for Efficient Aggregation of Resources for Economic Public Goods on the Internet* http://www.press.umich.edu/jep/works/HallgModel.html

Hayek, F. A. 1992: *Végzetes önhittség. A szocializmus tévedései.* Tankönyvkiadó, Budapest.

Hjerppe, R. 1997: *Provision of Public and Merit Goods: Towards an Optimal Political Mix?* Research in Progress 10. UNU/World Institute for Development Economic Research, Helsinki, February.

Holcombe, R. 1998: Markets of the Quality of Life. An Interview With Randall G. Holcombe. *The Austrian Economics Newsletter*, Summer.

Hyman, D. N. 1989: *Modern Microeconomics. Analysis and Applications.* Irwin, Neww York.

Hume, D. 1976: *Értekezés az emberi természetről.* Gondolat Kiadó, Budapest.

Johnson, D. B. 1999: *A közösségi döntések elmélete.* Osiris Kiadó, Budapest.

Kaul, I. 2001: Public Goods: Taking the concept to the twenty-first century. In Drache, D. (ed): *The Market of the Public Domain.* Routledge, London: 255-273

Kopányi, M. (szerk.) 1993: *Mikroökonómia.* Műszaki Könyvkiadó, Budapest.

Mansfield, E. 1975: *Microeconomics. Theory and Applications.* W. W. Norton & Company Inc., New York.

Mas-Collel, A., Whinston, M. D. and Green, J. R. 1995: *Microeconomic Theory.* Oxford University Press, Oxford.

McKenzie, R. and Tullock, G. 1978: *Modern Political Economy: An Introduction to Economics.* McGraw-Hill, New York.

Mozsár, F. 2000: *Az extern hatások szerepe a regionális gazdasági teljesítmény magyarázatában és növelésében.* In Farkas, B. and Lengyel, I. (eds): Versenyképesség – regionális versenyképesség (Competitiveness – regional competitiveness). SZTE GTK Közlemények, JATEPress, Szeged: 100-114

Musgrave, R. 1959: *The Theory of Public Finance.* McGraw-Hill, New York.

Olson, M. 1997: *A kollektív cselekvés logikája.* Osiris Kiadó, Budapest.

Parkin, M. 1990: *Economics.* Addison-Wesley Publishing, USA.

Pearce, D. W. 1993: *A modern közgazdaságtan ismerettára.* Közgazdasági és Jogi Könyvkiadó, Budapest.

Samuelson, P. A. 1954: The Pure Theory of Public Expenditure. *The Review of Economics and Statistics*, 36: 387-389

Samuelson, P. A. 1955: Diagrammatic Exposition of a Theory of Public Expenditure. *The Review of Economics and Statistics*, 37: 350-356

Samuelson, P. A. and Nordhaus , W. D. 1985: *Economics.* McGraw-Hill, New York.

Samuelson, P. A. and Nordhaus, W. D. 1988: *Közgazdaságtan*. Közgazdasági és Jogi Könyvkiadó, Budapest.

Smart, M. 2002: *Private provision of public goods.* University of Toronto Department of Economics, Toronto. www.economics.utoronto.ca/msmart
Stigler, G. 1989: *Piac, állam, szabályozás*. Közgazdasági és Jogi Könyvkiadó, Budapest.
Stiglitz, J. 2000: *A kormányzati szektor gazdaságtana.* KJK-Kerszöv, Budapest.
Schiller, B. R. 1986: *The micro economy today.* Random House, New York
Varian, H. A. 2001: *Mikroökonómia középfokon. Egy modern megközelítés.* KJK-Kerszöv, Budapest.