

A THEORETICAL ECONOMIC TAXONOMY FOR URBAN TRANSPORT

*RAMOS, Rubens E.B. Federal University of RN (UFRN), Natal, Brazil.
rubens@civil.ufrn.br;rubensramos@gmail.com*

ABSTRACT

Urban transport economics has been mostly considered under the theory of private economy. However, the evolution of economics science has provided a broader classification of economics goods (private goods, public goods, club goods, common-pool resources) that can be applied to urban transport economics. This paper tries to contribute to an economic taxonomy of the passenger and individual urban transport economics. Beyond the fact that taxonomy is *per se* scientifically relevant, the subject of the paper could provide general economic theoretical foundations for urban transport policies regarding topics such as traffic limited zones, congestion charges, parking fares, public transport pricing or free public transport, taxi service, school transport.

Keywords: Urban Transport, Transport Economics, Goods Taxonomy

INTRODUCTION

Urban transport economics has been mostly considered under the theory of private economy. This is a corollary of the perception of Buchanan that there's a general understanding that the implied institutional setting in economic theory is a regime of private property, in which all goods and services are privately (individually) utilized or consumed. In this way, in theory and in some way in practice, the urban transport service has been considered as an ordinary private consumption good, with market failures and externalities that calls for some regulation.

Also Léon Walras (in discussing the railway economics suggests that it is a mistake the wish to apply to the most cases as possible the theory of private goods, and so the intent in blend the services or goods of public interest in those of private interest.

In this paper I also challenge the assumption that urban transport economics is the sole field of private goods. I think that the urban transport service could be better classified in broader classification of types of economic goods, which can ultimately leads to a better understanding of the economic forces acting on the transport services and so to better development of urban transport policies.

The evolution of economics has provided a broader classification of economics goods beyond the single private goods, such as public goods, club goods, common-pool resources. In this paper I try to apply these “new” concepts to passenger urban transport economics.

This paper tries so to contribute to an economic taxonomy of the passenger and individual urban transport. Beyond the fact that taxonomy is *per se* scientifically relevant, the paper can be useful for providing general economic theoretical foundations for urban transport policies regarding topics such as traffic limited zones, congestion charges, parking fares, public transport pricing or free public transport, taxi service, school transport.

However, it should be noted that this paper reports a theoretical research in progress. And urban transport here means the urban transport of people.

Urban transport and services goods

The very first thing on transport is that transport is a service. Since Adam Smith (1776) and also Marshall (1920), the understanding of economic nature of service is that services are economic goods which pass out of existence in the same instant that they come into it. For Adam Smith, because the labor on services does not fix or realize itself in it, services labor does not leave any trace of value behind it. In not being able to be stocked, service goods are not part of the stock of wealth of a person or of the nations. Services goods itself cannot be possessed, and cannot be transferred.

Saying that services goods do no add to the wealth does not mean that the service production system would not be part of the wealth. As we will discuss next, service production systems is part of the wealth and services goods contribute for the efficiency of others economic activities that produce wealth. Let’s understand more exploring the economic goods.

CLASSICAL ECONOMICS GOODS DEFINITIONS

Economic goods as classified by Adam Smith

Adam Smith (1776) has perceived that the stock or accumulation of goods is a necessary condition for the economic exchange, and that exchange results of division of labor in society.

Adam Smith has a classification of economic goods (Book II, Chapter I) in terms of three general categories: 1) goods for immediate consumption, 2) goods used as fixed capital, and 3) goods used as circulating capital. The stock of these goods forms the wealth of the nation.

The stock of goods for immediate consumption consists of goods purchased but not yet consumed, e.g. food, but also things like clothes, furniture and houses. But clothes can last for years, furniture for decades and houses for centuries. In the Adam Smith's economic taxonomy, though the period of their total consumption of houses can be measured in decades or centuries, they are still a stock reserved for immediate consumption as are either clothes, household furniture, or food. It is in this sense that the cars are considered nowadays, when purchased by an individual for personal use, a consumer good, though durable.

In this sense, a private car is a stock of a durable economic good for immediate consumption. The service that the car renders to his owner is the consumption of the stock of the material good car, and the consumption of the stock of fuel and lubricants and all material used to driving the car.

The second economic goods type is the fixed capital, which has the characteristic of afford revenue or profit without circulating or changing. The fixed capital consists of four goods: 1) machines and instruments used by labor; 2) buildings used for economic activities or that generate rent; 3) improved land; and 4) the acquired and useful abilities of all inhabitants and member of the society.

We may consider that the car when used for taxi services is a fixed capital of type one, a machine. The acquired ability of the driver is a fixed capital of the fourth category, and we may say the streets as an improved land for transport purposes. The general public transport services would have the addition of buildings used for economic purposes as fixed capital.

The third type of economic goods is the circulating capital that is of four kinds: 1) money, the intermediate good for exchange; 2) goods for sale in commerce; 3) materials used in the production; and 4) finished goods not yet sold.

In the urban transport service, there is circulating capital comprises of some money for liquidity and purchasing of materials and services, and the stock of materials used in the production of the services.

One issue rises here in terms of the urban transport infrastructure (streets, bridges, tunnels, etc.) and urban facilities in general. When the transport infrastructure is used by the car driver for his travel to some leisure, it is been using as a consumption, not as a fixed capital. When it is used for some economic activity or for acquiring abilities (go to school, university) it is clearly a fixed capital. This make sense for charge the car owner a tax for consumption of the transport infrastructure and a conceptually different one for the vehicles owners that use them for revenue or profit purpose, what means, in an economic way.

A theoretical economic taxonomy for urban transport
RAMOS, Rubens

Considering now the services, we can see that the service goods production is an economic production system that uses fixed capital like vehicles, buildings, general transport infrastructure, and dedicated public transport infrastructure like bus stops, tramway stations and tracks, metro stations, tunnels and tracks. It uses also others goods as circulating capital, like skilled labor, fuel, lubricants, tires, etc., and other service goods provided by third party private businesses and public services like traffic control.

Table 1 presents the good types considered by Adam Smith and some tentative examples on ordinary and urban transport application.

Table 1 – Goods as classified by Adam Smith

Type	Subtype	General description	Ordinary examples	Urban Transport
Consumption goods		Goods for immediate consumption purchased but not yet consumed. It doesn't matter the duration of consumption.	Food, clothes, shoes, houses and apartments for residential purposes.	Cars owned by individuals. Fuel in the private car's tank. Purchased winter tires for private car.
Fixed Capital	Machines	Machines used for economic productive	Drilling, saws, milling, grinding, planner, etc. Vehicles.	Cars, Buses, Tramways trains, trains (railway, subway)
	Buildings and improved Lands	Buildings and improved lands used for economic purpose.	Houses and apartments for rental purpose, apartments for hotel. Farms.	Garages, transport terminals and stations, bus and tramways stops, tunnels, bridges, streets.
	Human abilities	Abilities acquired that are useful for economic purposes	Technical skills like how to operate a machine, how to make bread.	Car and bus driving abilities, abilities to operate tramway, train, subway
Circulating Capital	Money	Money used for economic activities. Money not used is savings.	Cash in firms used for their operations.	Cash for change and buying fuel of a taxi driver.
	Goods for sale	Goods in stock in the commerce for sale.	Foods in supermarkets, clothes in stores, cars in car dealers, cars in transit from the manufacturer plant to car dealers.	None.
	Materials and unfinished goods	Materials in possession for economic activities. Materials in use in the economic production. Unfinished goods.	Raw materials as cotton in the stock of a textile firm. Parts manufactured of a final product not yet completed.	Fuel, tires, lubricants. Electrical energy consumed in operating the transport service.
	Finished goods	Finished goods not yet sold.	Cars completed in the car manufacturer not yet sold.	None.

We may say than that the services themselves are not part of the wealth of the nation, what is part of the wealth of the nation are the services production systems, the combination of fixed and circulating capital, organized in such way that can provide the service.

We may say also that the consumption of service goods is actually the consumption of the service production system. What matters is the availability of the service production system, and what is purchased is the right to use it for the rendering and simultaneous consumption of useful service.

When someone takes a taxi or buys a bus ticket he or she is buying the right to consume the taxi or bus service system in some way. In the case of urban public transport, this way is in a collective way, what means that the bus service system does not change to provide

personalized service to an individual. This collective use of the system suggests that the bus service in a public transport system departs from the common private good, because the individual buyer cannot use it as he or she fully wanted it. The user, as we call him or her, cannot take possession, even temporarily, of the service system.

It doesn't matter when an individual want to take the bus, where the individual would like to stop, or what route would be preferable by he or she, the bus system will pass only in some schedule time, it will take the planned route only and will stop only in the bus stops. The time schedule, route and stops were all planned for the collective use in mind. It means, also, that the bus service user cannot have full possession of the bus service production system. Actually the user has no possession at all beyond the single small place he or she occupies in the vehicle, and must obey for the rules of the transport service like, e.g., not smoking.

The case of the taxi service is quite distinct. The buyer of the taxi service can have the service fully as he or she wish, taking it whenever he or she wish, boarding where he or she wish, taking the route he or she wish, stopping where he or she wish, and in general smoking if he or she wish. When someone takes a taxi, he or she takes full possession of the taxi service production system and on its result. The taxi service is clearly a private good. The bus service is clearly not. And if the bus service is not a private good, it should be another thing.

Alfred Marshall's economic goods

Alfred Marshall (1920) initially advert us from the mischief in the temptation to classify economic goods in clearly defined group, with short and sharp propositions, drawing artificial lines of division where has none. For instance, Marshall suggests "there is not in the real life a clear line of division between things that are and are not Capital, or that are and are not Necessaries, or again between labour that is and is not Productive."

Despite these concerns, Marshall defines goods as the desirable things, classifying in Material, or Personal and Immaterial. Material goods are useful things and all rights to hold, use or derive benefits from material things, or to receive them at a future time. In this sense, financial rights like mortgages related to material things, shares in companies, are all economic goods. Also, opportunities of travel, access to some place, are economic goods.

We may say then that services are economic goods as a right to use or derive benefits from material things.

The non-material goods fall into two types. The first is the qualities and faculties of one, like abilities and skills, which Marshall classifies it as *internal*. The second is an *external* type because consisting of relationships, like good will and business connections of business men, related but external to the individual.

Goods can be transferable or non-transferable. In the group of non-transferable goods are those personal qualities and also the advantages of climate, the privileges of citizenship and

rights and opportunities of making use of public property. The public properties that are gifts of nature are usually free, except when the nation turns the rights to access or use a private one. Land in its original state is a free gift of nature but it is not a free good in settled countries. But, part of the land can be free and be a national property, for exclusive use of members of certain nation, being free for the individual member.

What is interesting here is the institutional way Marshall uses to consider goods that are originally public goods. A public or nation good can be free for its members, or can be private if the rights to access and use are restricted. So an economic good can be free if the appropriate institutional rules are in place.



Figure 1 – Marshall's classification of economic goods (Marshall, 1920)

The second question regarding economic goods is which of them are part of the individual's wealth. For Marshall they are of two classes. First, all the material goods to which an individual has (by law or custom) private rights of property and which are transferable and exchangeable are part of the individual's wealth.

However, services and other goods, which pass out of existence in the same instant that they come into it, are not part of the stock of wealth. Here Marshall follows Adam Smith and we can summarize that services are not part of the wealth. However, as we stated before, we may say that all material and immaterial goods related to service provision are part of the stock of wealth of an individual and nation.

Second, all those immaterial goods that serve directly as means of enabling an individual to acquire material goods are part of the individual's stock of wealth.

Wealth relates to those goods, and only those, which is in the scope of economic science, the economic goods. A private wealth, private economic good i) belong to an individual and do not belong equally to his neighbors; and ii) is directly capable of a money measure. We may take the former to say that the taxi is a private good and provides a service which result belongs to an individual and do not belong equally to his neighbors, but most of all a public transport system goods belong equally to all passengers, and its service provides a result that do not belong uniquely to one but equally to many or all members of the community.

And then, Marshall deals with those material goods which are common to an individual and his or hers neighbors. An individual derives benefits from these goods from being a member

of a certain state or community, like benefiting from the right and opportunity to make use of public property and institutions such as roads, rights to justice, or to a free education. And Marshall goes beyond and considers that as many of things in live are collective goods, this leads to consider wealth from the social, not only the individual point of view.

For Marshall, the most obvious forms of social wealth are public material property such as roads and canals, buildings and parks, gasworks and waterworks.

The national wealth includes the individual as well the collective property of its members. And individual and national rights to wealth rest on the basis of civil and international law, or customs that have the force of law. For our discussion in this paper, it is important to keep the idea that property is a legal concept, not an economic one.

Property rights can turn some material good a private or public property, part of the individual or social wealth. In our contemporary democratic society, property rights must be democratically set.

The legal dimension plays then an important role in goods classification as private or public goods.

The special good called Capital

Marshall considers that the term Capital has two main ways to be defined, from the point of view of an individual or business, and from the point of view of society.

In the discussion of the social dimension of the term capital, Marshall ends up with the general understanding of French economist like Turgot and Walras, but also with Jevons, Pareto and Fisher. Capital includes all accumulated wealth, all the result of the excess of production over consumption.

Marshall discusses also two aspects of Capital, its “productivity”, which means its use for production, and its “prospectiveness”, which means its capacity in secure benefits in the future rather than in the present.

The capital can be private or public, and for both, more capital means more wealth and more future possibility of generating wealth.

This discussion on capital suggests that more the urban transport consist of fixed capital, more is its capacity in provide productive services and more its future ability in generating benefits.

CURRENT ECONOMICS GOODS DEFINITIONS

Private and Public goods

The two opposite ends of the range of economic goods classification are the private or individual, and public or collective goods. We discuss here the main criteria to classify them.

Divisibility and Exclusive Possession

Bowen (1943) categorizes the private and public goods as individual and social goods, differing in the divisibility of the demand. Bowen appears to be the first to use the criterion of exclusive possession to define individual (private) and social (public) goods, as a consequence of the divisibility property. According Bowen, the individual (private) goods “can be divided into small units over which particular persons can be given exclusive possession,” and social (public) goods “are not divisible into units that can be the unique possession of individuals. Rather, they tend to become part of the general environment – available to all persons within that environment.”... “Consequently, these goods cannot easily be sold to individual consumers and the quantities adjusted to their respective tastes. The amount of the good must be set by a single decision applicable jointly to all persons. Social goods, therefore, are subject to collective or political rather than individual demand.” (p.27)

Subtraction in consumption and supply

Paul Samuelson (1954) defines the private and public consumption goods in terms of subtraction in the consumption. For pure *ordinary private consumption goods*, the total supply equals the sum of the consumption of each individual. So, each consumption of the good by individual *A* subtracts the good available for consumption by individual *B*. Actually, the individual *A* can consume all goods available and nothing rest for the individual *B*.

In terms of supply and demand, Samuelson states so that, considering *n* individuals, *y* the supply and x_i the consumption of the individual *i*,

$$y = \sum_{i=1}^n x_i$$

For pure *collective consumption goods*, supply and consumption are the same for each individual in the sense that “each individual’s consumption of such a good leads to no subtraction from any other individual’s consumption of that good. The supply is the same for all consumers, $y = x_1 = x_2 = \dots = x_n$, or $y = x_i \quad i = 1, 2, \dots, n$.

In this way, quite opposite to the private consumption good, the consumption of one unit of the public good give not an exclusive possession of that good and do not subtract the supply, the good continues to be equally available for others.

Taking the urban transport, we can easily see that the taxi service is a private good in Samuelson’s theory, which consumption by an individual subtract the service and the service

system from all others. In an opposite way, when one individual consume the service of a bus public transport service he or she not subtract the service or the service system from others, the service and service system is in the same moment equally available for others, there's a collective consumption. And larger the public transport technology, like tramways, subways, more collective is the consumption of the transport service.

Rivalry and Excludability

Other usual criteria to differentiate private from public goods are rivalry in consumption and excludability. Public goods has two properties, non-rival consumption and non-excludability (Stiglitz, 1999, 2000; Kaul, Grunberg and Stern, 1999).

Non-rivalry property means that there's no individual competition for the benefits of consuming the good, or that a consumption by one individual does not prevent that other individual consumes it.

In the opposite, private goods have rival consumption, what means that the consumers bids for unique consumption of the good. One main consequence is that for the rivalry exists the scarcity of the good is a necessary condition – the consumers must bid for the good, and that one with higher marginal utility per money will consume it.

Non-excludability property means that it is almost impossible or costly to exclude someone to consume the public good. The private goods are excludable means that it is technically easy or cost effective to exclude someone to consume the good.

Buchanan (1966) takes two principles, availability and excludability of benefits. In one way, a public good is such one that it is not possible or efficient to exclude someone from benefit from it once it is produced.

Consumption Sharing and Membership

Using the words of Buchanan (1966, p.49) on the orthodox definition of public goods, a pure public good or service is equally available to all members of the relevant community. In the discussion on club goods, as we will see later, the two criteria are consumption sharing and size of membership unit (Buchanan, 1965).

A private good has no consumption sharing because consumption by one individual reduces potential consumption of other individuals by an equal amount. Also, the size of the membership unit of consumption is one, an individual or family (or household).

The pure public good has consumption sharing in the sense that consumption by one implies in equal availability of same consumption by all others. The size of the membership group of public goods consumption is an infinitely large number of members. However, Buchanan

states that, “*strictly speaking, no good or service fits the extreme or polar definition*” of public goods.

We can relax a little here the consumption sharing and membership unit size. Instead of availability to an infinitely large number, we can say availability to all or almost all the society. Instead of same consumption by all others, the consumption by a large numbers of individuals, at the same time, with the same or almost the same quality.

In this little relaxed form, the public transport services fits the concept of public good because when one individual takes a bus, a tramway or a subway, the very same service is simultaneously available for a large number of other people. If we take a single bus, we have about availability for 60 others individuals, a tramway for others 300, a subway for others 600. If we consider one time-window large than the single moment, for instance, in 30 minutes, this numbers increases to a very large number of simultaneous availability of the same service.

Considering the membership, in a case of free public transport, all members of the society are members of the service demand, not only that one with the appropriate income.

Divisibility and Size of Demand Interacting Group

In a later, Buchanan (1968) suggest that the focus should be make in how the goods should be supplied, or, “under what circumstances will collective-governmental supply be more efficient than private or non-collective supply” (Buchanan, 1968, p.172). To deal with this question Buchanan considers two criteria, the degree of indivisibility of the good and the size of demand interacting group.

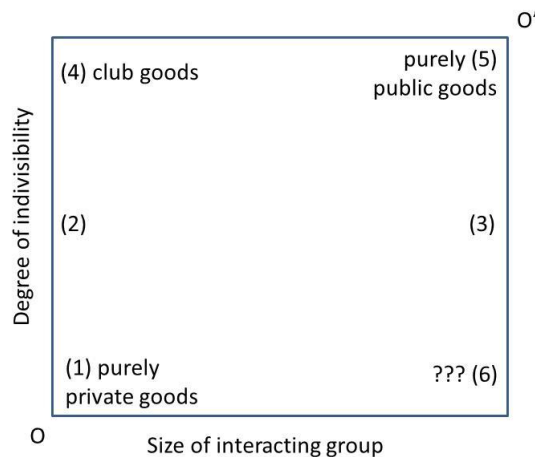


Figure x – Buchanan’s goods classification matrix

In Mugsrave terminology in terms of exclusion, “*additional consumers may be added at zero marginal cost.*”

Club Goods

Buchanan (1965) proposes another type of economic good between the range private-public, the club goods. For Buchanan, the main issue for placing a good in the private-public spectrum is that the utility that an individual receives from its consumption depends upon the number of other persons with whom he or she must share its benefits.

Club goods are economic goods with two main properties; they need a membership for sharing the benefits exists and they are goods where exclusion is possible. Club goods theory applies only to groups formed with an economic motivation, where the choice to share the cost and the consumption and benefits instead of individual cost, consumption and exclusive benefits. For instance, people can join a swimming pool club or can have a pool at home.

We can realize here that the membership must not be permanent, but can be temporary. The only thing that matters is that to consume the good and individual must be member of the club.

In other words, club goods are goods of collective consumption of some N members, and M others individuals are excluded from that consumption. And M should be far greater than N .

From this concept we can take a path a little bit different from Buchanan and consider that the club good membership is actually a membership for costing the good production system, and for using as one want it. Usually, in swimming clubs for instance, the individual is not charged every time enter in the swimming pool, but must pay for the entire season or for an entire appropriate period (day, week, etc). So, what it is really consumed is the good production system and not the good itself. The club good production system is made available for each member for any level of consumption he or she want and while his or her consumption level does not affect the availability of the system to the others members.

In the case of service goods, it is expected, for instance, that a broadcast paid TV should be more profitable as a long contract like subscription than by a pay-per-view basis. The subscription like contract is paying for the availability of the production system.

One kind of club good type in urban transport is the school transport service, where everyone not included in the category student is excluded from the service. Also, the service is an equal collective consumption of each student using it.

Common-pool Resources

In the definition of Ostrom (1990, p.30), the term “common-pool resource refers to a natural or man-make resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.”

The origins of common-pool resource economics are in the commons issue theory presented in two lectures delivered in 1832 and published in 1833 by William Forster Lloyd (Lloyd [1833], 1980). The commons were the pasture land available to all cattle-owners of one region for free use. The land is no one possession, but a collective or public one. Lloyd has showed that if each individual act in his best interest, each and every one will increase the size of their herds in the commons and, as the commons is a finite land, eventually the size of the herds on the commons will exceed its carrying capacity and that it will be the ruin for all. On contrary to the case of the market of private goods, in the commons case, the individual who intends only his own gain and acting as being led by an invisible hand will promote the ruin of the public interest. The invisible hand here will fail. This Lloyd idea were taken again by Gordon (1954) dealing with fishery, and must notably by Hardin (1968) in a seminal paper that spread the idea of the *tragedy of the commons*.

The solutions that Hardin (1968) presented to the tragedy of the commons were two - socialism or “privatism”, what means the government with social mutual coercion mutually agreed upon take over the commons, or privatization of the common resource will control the access and exclude the excess of use.

Ostrom, Gardner and Walker (1994) propose a classification of the four types of goods considering the subtractability and excludability.

The exclusion here is considered in both economic and legal sense. In the economic sense, the exclusion must be technically cost effective, for instancing with fencing or packaging, and derives mainly from physical attributes of the goods. But, fencing and packaging must be backed by a set of property rights that are feasible to defend in the legal system, what means that the exclusion must be social and politically acceptable.

The subtractability relates to the degree of subtraction of one person’s use or consumption from that available to ben used or consumed by others. Although the authors do not explicit, it can be see here that the size of the supply or total availability of the goods affects the degree of subtraction.

In this way, they classify four types of goods. The classification is shown in Figure 1.

		Subtractability	
		Low	High
Exclusion	Difficult	Public Goods	Common-Pool Resources
	Easy	Toll or Club Goods	Private Goods

Figure 1 – A general classification of goods by Ostrom, Gardner and Walker (1994, p.7)

One interesting thing in the common-pool resource theory, especially in the classification of goods proposed, is that the divisibility of the good is not an issue at all. Actually, the economic property of a good is not directly related to its physical properties.

Take, for instance, the satellite TV service or the terrestrial digital TV. The electromagnetic waves of the TV channel signal are not divisible at all, nor the consumption of the waves by one individual reduces the possibility of others get the very same signal. However, the technical advance in coding and cryptography of the digital signal, and the low cost of production of the consumer equipment has allowed for the private and paid air television.

The case of digital television paid services, a private consumption good, shows that it is the exclusion the main criterion to divide the field of private and public goods. And the exclusion is based on economic and legal factors. One thing can be economically feasible but socially not, not acceptable legally.

For another two examples in this reasoning on economics and legal, take slavery and farms. Farms used to be commons, the common-pool resource, a public property. Only when the legal possession of land became socially acceptable the farms evolved. The labor used to be cheap when slavery were acceptable, what is not anymore nowadays.

We may summarize then that the main issue in private and public divide of an economic good is the possibility of exclusion, mainly a legal issue, what means, a social issue, not a technical one.

A TENTATIVE CRITERIA FOR THE TAXONOMY OF PASSENGERS URBAN TRANSPORT SERVICES

So we reach the point where to find the criteria for an economic taxonomy for passengers urban transport services. We take the main passenger urban transport to adopt the taxonomy: private vehicles, taxi, public transport as bus, tramway, subway.

Wealth, private and public

We take here the definition of wealth in being material goods and immaterial goods that serve directly as means of enabling an individual to acquire material goods. These goods can be of private or public property.

We must adopt here the same understanding of Adam Smith, Alfred Marshall, that service, though an economic good, is not part of the wealth because it vanishes in the same moment of production and consumption. Service does not last. As a corollary, all service dimension of urban transport is not part of the individual wealth, nor the nation or social wealth.

So in urban transport, the private vehicles like bikes, motorcycles, cars, the private stock of fuel, spare tires, etc. are all part of the individual wealth for immediate consumption, some for years or decades. The transport that this wealth renders is not wealth, but a result of the wealth.

The taxi vehicles, the taxi driver ability, all material goods involved are part of the wealth of their owner, but the taxi service provided by this wealth is not part of the wealth. Usually, the taxi related wealth is a private, individual wealth.

All infrastructures, vehicles, workers ability to operate public transport system are part of the wealth. In some cases, part of this wealth is private and part is public. Usually, as large is the capital needed, more the trend

Production of Wealth, Consumption goods and Capital

The division is made in the point of view of the user of the economic good. The main division here is that consumption goods do not produce wealth (income or material goods) and capital is the excess of production that can be used to produce more wealth in the present or in the future.

Consumption goods

The private economic goods cited above, e.g. a private vehicle, are all consumption goods no matter how long they last. Cars can last for decades, but they are really being consuming during their existence.

All passenger urban transport commercial services, from taxi to public transport service, disregarding individual or collective consumption, are consumption goods.

Capital

All the vehicles used to produce urban transport commercial services are Capital, and so all the material goods used, and all the abilities of the workers.

We may divide this capital in the same way Adam Smith suggests, and contemporarily adopted in business, as fixed capital and circulating capital.

The fixed capital consists mainly of vehicles, buildings, road infrastructure, and also the abilities and skills of the workers. The latter we may use the contemporary term human capital.

The circulating capital consists mainly of money for day-to-day money needs, and all material goods under possession of the urban transport firm to produces the transport service.

Consumption goods, capital, and wealth

One consequence of this classification and analysis is that though both part of the consumption goods (private vehicles) and capital are part of the social wealth, as more the private vehicles are part of this wealth, less it consist of capital. In other words, less public transport means less social capital and so less ability to provide or contribute to more wealth in the future.

From a social point of view, the increase in public transport as part of the urban transport means an increase in the total capital of the society, an accumulated wealth.

Possession and supply of economic goods, private, club, public, common-pool

The possession is closely related to property rights to hold, use, benefit and exchange an economic good. Possession and property is related to exclusion.

The property rights need the social acceptance and also the technical and economic feasibility to do it. For instance, it is technically almost impossible to take possession of the air of Earth atmosphere, or the water of the oceans.

The private possession of land is a legal concept, not a natural one once land is a free gift of the nature. However, the technical and economic evolution allowed for private possession of land.

The possession in consumption has its effects in supply, for instance, a private possession means exclusion and so the supply is limited to the included demand. In the opposite side, a public consumption means that the supply must be provided for all, what means in practice that there will be always some excess of supply related to total demand. This is especially important in the case of urban transport because the excess of supply cannot be stored to later consumption.

We deal with the four main types of goods related possession considering both consumption goods and capital.

Private Goods

The exclusion in pure private good is technically and economically feasible, and socially acceptable, usually with a price that generates profit, and with the rivalry in consumption socially acceptable. In a fixed price system, the private good supply must be less the total possible demand in order to exclude and set a price level enough to produce profit.

In a contemporary wealthy society the private car for own individual transport is the more typical private good. In this sense, the private car is a private transport consumer good than provides to its owner full possession of his or hers transport in the city. This also means that

the private car takes an individual possession of the space it occupies in the urban transport infrastructure. We deal with it later.

The closest urban transport commercial service that fits also the private good economic exclusion features is the taxi service. Each taxi trip taken by one excludes all others from the same taxi and driver. Also, the price of the trip generates profits for taxi owners, and as the service is intended for a small part of the society, it is socially acceptable that the taxi service would not provide transport service for all.

In doing so, one main consequence of this is that the taxi service should have no economic regulation at all, i.e., no regulation of the economic supply, price or quantity. Only issues on safety and security, or city image (e.g. color of the taxis) should be regulated, not economic ones.

Public Goods

To be a public good the exclusion must not exist. This can be a consequence of the physical and technical properties of the service but also of its supply. One way to have a low subctratability is with a supply above the demand. The public transport system provided by bus, tramway and subway fall in this concept. In a growing scale, bus, tramway and subway public transport supply is above the demand most part of the day, the week, the month, with some moments of congestion.

But, any fixed fare adopted in the public transport creates exclusion, no matter what scheme of fare adopted but one. The only fare system that not creates exclusion would be a fare based directly on the decreasing marginal utility of income, what it is not technically feasible to do at the moment of use.

However, there´s another technology available to cover the cost of the provision of public transport service according income, the central tax system. Using a centralized progressive tax system on income (or consumption) to finance the public transport system and making it free at the moment of use would eliminate the economic exclusion of using it.

Also, to avoid exclusion because of supply, the supply must exceed the total demand in certain level. This level would be a quality level decided by the society.

Common-Resource Goods

The transport infrastructure is clearly classified in the common-pool resource concept, encompassing both the gifts of the nature (the topology of the land, the geology, the rivers or lakes) and the built resources (streets, bridges, tunnels, transport terminals). And being a common-pool resource with finite capacity in terms lapse of time, however renewal in day-by-day basis, the transport infrastructure has the trend to be congested if a free market use be adopted above certain demand level.

As in the case of common-pool resource researched by Olstrom, with some low demand-supply rate, the transport infrastructure can be let to the free consumption by users. But, eventually above certain level of demand regarding transport supply capacity the result of free use is congestion. And in the Hardin words, there are only two ways for assured the best social output, to socialize or to privatize it.

Privatize means give someone the legal right to charge users of the transport infrastructure as it was his property, and so to price the use of it in a market way, what means putting a price high enough to exclude users with low marginal utility, get profit, and keep the infrastructure in such economic state that allow for continuous profitable operation. And being a monopoly, the price would be arbitrary and high enough to maximize profit above the expected free market price (and less supply). Also, with more appropriate technology, the private owner of the infrastructure can easily price the users according his marginal utility of income, for instance, with a progressive toll based on the price of the car and, of course, with some additional privileges in using the transport infrastructure to be more easily acceptable.

The other way is the “socialization” of the transport infrastructure, what means that it being a public property and with some kind of voluntary form of limiting its usage to this capacity. In this way, the restriction for use must adopt the income marginal utility – any fixed urban toll creates economic exclusion.

Toll or Club goods

The size of the demand and its relation with the degree exclusion of individual possession suggests that the school transport can fit the concept of private club good. The use of bus or minibuses to provide private school transport would be bases on the size of the demand. So, the school transport could be let to private provision in terms of the transport service itself. The cost of the school transport would be associated with the real estate costs of the family. However, in a social definition of full free public education to the youths, any school transport that needs to be paid by the family turns public education not free at all. So, the school transport should be devised as a free public transport service or included in the general public transport system. Including the school transport demand into the public transport system is usually most economically effective because of both scale and scope economics.

But, in some cases with low demand, the public transport system can be devised as a toll good, with a fixed fare set to some demand. Actually, most of the public transport systems are provided as toll or club good, private or public. The expected behaviour of the demand is to be limited related the toll (fare) and so, it will not serve all the public.

Other common transport service that can be classified as a private toll or club good is the tourism transport services. The service is the same for all consumers, and a fixed toll (price) is charged. The consumption of the service is collective.

MAIN CONCLUSIONS SO FAR

In this theoretical research, I think I reach three main conclusions. The first one, in a positive way, is that the taxi service has all the characteristics to be more efficient provided as a private good. So, in one normative perspective for urban transport policy, the taxi service should have no economic regulation at all, and only those regarding safety, security and city image (standardization of vehicles). The invisible hand could take care of taxi services, and actually the regulation should be put to avoid anti-competitive behaviour resulting of concentration.

The second is that the urban transport infrastructure is a common-pool resource and in most of the middle size and big cities it has a capacity below the free use demand. The congestion must be controlled in some way. The urban toll can be one of that, but only if a progressive toll based on income would be set, e.g. a progressive toll based on the price of the car. In such way, it could be adjusted the demand with the capacity in a fair economic way, with each car user paying the same economic value for using the infrastructure, what means that the money price of the toll would vary for each user regarding the income. Fixed urban toll turns the public common-pool resource in an economically private possessed because creates arbitrary economic exclusion based on income.

The third conclusion is that the public transport system has the necessary characteristics to be provided as a public good, and any fare adopted turns it in a club good type, with exclusion of part of the demand. Because its low degree of subtractability or divisibility related to the technical form of supplying it, it is not easy to turn the public transport in a private good with a fixed price. So, I think that the most efficient way in providing public transport is turning it in a public good paid by tax, what means, free at the moment of use, with no fare at all, and should be supplied in certain excess level.

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