



ISTITUTO DI STUDI E ANALISI ECONOMICA

Land Use, Congestion and Urban Management

by

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ABSTRACT

In this paper we discuss the role that different instruments of pricing policy could play in promoting an efficient use of land, that is becoming a more and more scarce good through time. The main area where pricing instruments should be employed is the transport sector, particularly in urban areas. A growing experience has been accumulated during the last years and pricing for the use of roads, either through parking fees or through electronic road pricing, has been experimented in many countries with results that seem encouraging.

One important conclusion that emerges from our analysis is that, notwithstanding these positive results, pricing policy for the use of roads is a necessary condition for getting efficient results, but by itself is not sufficient. Equally important is the need to integrate pricing mechanisms within land use planning, but both theory and practice are lacking on a wide range of issues related to the land use impacts of road pricing.

Keywords: Traffic - congestion - management in Italian urban areas.

JEL Classification: R41 – R52 – H23.

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1 LAND USE AS AN ENVIRONMENTAL PROBLEM

One of the main environmental problems human beings have to face regards the use of land. Land is a scarce good, especially in areas with high population density due to an advanced degree of industrialisation. The price of land is generally determined in the market through the interplay of demand and supply, but the environmental impact - and the opportunity costs - of an excessive use is disregarded with an ensuing excessive use of a precious good. Hence, regulations are needed to rule this market and to internalize the external costs linked to the use of land.

The scarcity of land is growing around the world due to two main driving factors:

- a. population growth. In the past century there has been a big increase in the amount of population, for several reasons, but mainly for the increase in the birth rate, especially in underdeveloped countries, and the amazing decrease of mortality rates for babies, and for adults too, due to the impressive evolution of medical treatments and the use of more effective drugs. Life expectancy in less developed countries increased by ten years in less than two decades (from 43 in 1950's to 53 in 1970's). This is a positive development, but the pressure on land, for different purposes, is unrelentingly increasing. There are more people malnourished or starving today than in 1950;
- b. concentration in the urban areas. Industrial growth takes place predominantly in the cities, where the concentration of people is already high and different types of workforce and services is available. From one side this phenomenon increases the demand for land in urban areas, where the availability of this resource is already scarce; from the other side, there is a diminution of population living in rural areas, hence agricultural production for self-consumption diminishes notwithstanding the rapid increase in productivity due to the use of fertilizers and pesticides, that boosts production but with a negative impact on environment.

In developing countries both phenomena are present¹, but a further element of difficulty is linked to the limited quantity of productive land. In recent years this difficulty has been raised by an extensive desertification of an increasing share of agricultural land. Climate changes are probably the main cause of this, but there are human behaviours too that have a negative influence on the availability of productive land. Furthermore, the structure of agricultural production in these countries has been distorted by an increased

¹ Van der Ploeg, F. and Poelhekke, S. [2008].

demand for bio-fuels using as feedstock different kinds of agricultural products: given the limited availability of arable land, as a consequence the production of cereals and other foods for human feeding has been sharply reduced.

2 CONGESTION AND THE USE OF PRIVATE CARS

In urban and, still more, in metropolitan areas a growing problem is represented by pollution and congestion due to the use of private cars. It is now universally recognised that this kind of transport is unsustainable in the long run. But alternative modes of facing mobility demand are confronted with many difficulties:

- a. the building of the needed infrastructure is costly and requires long time period;
- b. new technologies find difficult to enter the market since they are more costly and in the short run less able to face the total amount of mobility demand;
- c. the finance of urban governments is normally constrained by the lack of adequate revenues to fund the needed investment.

All this implies that the shifting from private to public transport requires a long term perspective. If the final goal is to exclude [decrease?] the use of private cars for urban mobility, the problem that has to be solved is: How to fill the gap of mobility during the transition period? How to finance the investments required?

It is in this perspective that the implementation of regulatory measures for managing urban traffic and the introduction of different pricing methods for obliging the drivers to pay for the use of urban roads seem particularly justified. Road pricing has a first-round effect of rationing the use of private cars, but in the same time it provides the funds needed to enlarge the network of public transport and to support research efforts for the implementation of new technologies. As far as the network is completed - and new modes of transport are adopted - road pricing should be backed by a more and more compelling constraint on the use of private cars.

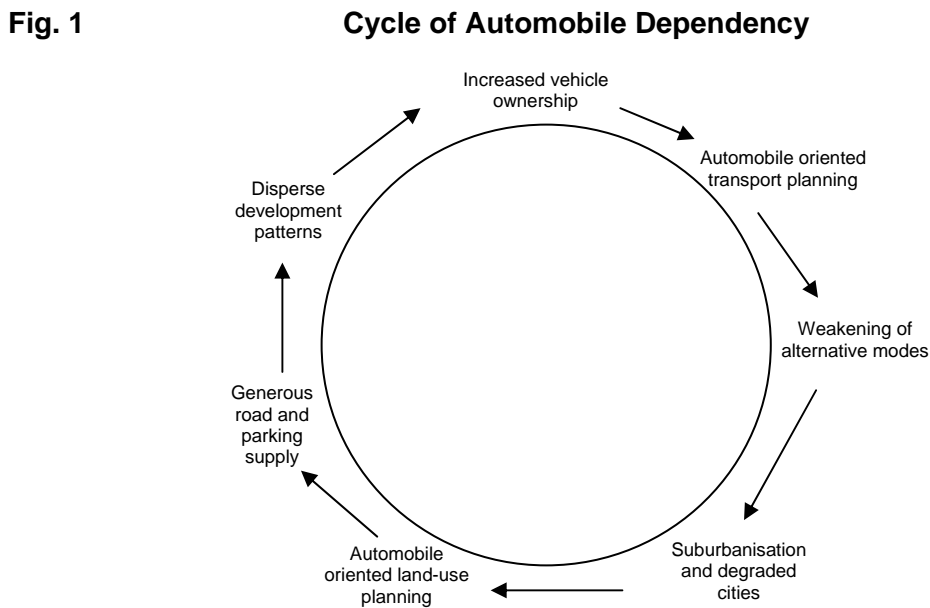
3 TRAFFIC AND CONGESTION MANAGEMENT IN ITALIAN URBAN AREAS

The general increase in real incomes in the recent decades has resulted in more cars, longer trips and fewer passengers per car in many European cities. The car has progressively evolved from an expensive luxury for a few to become a vital tool for the everyday lives and activities of the majority of people, bringing about unquestionable benefits, but even unintended and undesirable side effects.

If recent trends are not modified in the medium-long run, this could be the cause of great problems associated with binding targets on greenhouse gas emissions on the one hand, and with more local diseconomies like congestion, air pollution, noise, land take, fragmentation and visual intrusion on the other.

In particular, congestion and other externalities closely linked to vehicles-kilometres travelled² are widely acknowledged as becoming the critical issue regarding surface transport, especially in urban areas (Ieromonachou, 2007; Parry et al., 2007), since they cannot be tackled through stricter vehicle and fuel standards and the induced technological improvement.

This mobility-related emergency is favoured by the supply-side paradigm commonly adopted by public intervention in the transport sector – the so called predict and provide paradigm (Litman, 2006) – in which past trends are



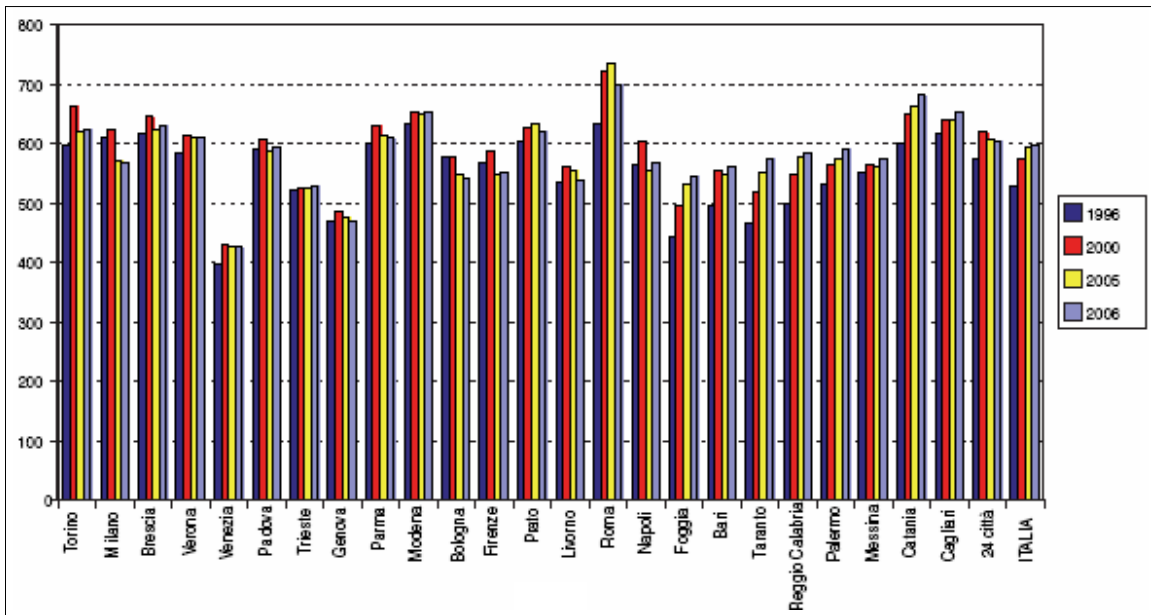
Source: adaptations on Litman (2006).

² We refer to problems like noise, land take, fragmentation and visual intrusion.

extrapolated to predict future demand, which planners try to satisfy, subject to budget constraints, with new road and parking supply. A paradigm which has nourished the cycle of Automobile Dependency (Fig. 1) and the self-fulfilment of its underpinning prophecy.

The consequences of this vicious circle are critical, in particular as far as the Italian situation is concerned. Italian towns, in fact, have seen in the last decades a considerable expansion of the gravitational area of passengers mobility³, which has brought about an increasing car-dependence (Fig 2) and a continuous loss of market share for non motorized and collective means. This progressive, never-ending, increase in mobility, together with the parallel continuous shift towards private motorised transport modes, in a context of compact, narrow and usually ancient cities, makes the overall problem dramatically serious⁴ (Fontana, Zatti, 2003).

Fig. 2 Motorization indexes (cars/1000 inh) in the main Italian cities



Source: APAT (2008).

Note: the average motorization index in the Italian Capitals of Province is around 615, while the same index calculated on a sample of 41 European cities is around 440.

In this framework, Italy and other western European countries are gradually learning that economic growth and urban congestion cannot be

³ A process which seems not yet completed: a recent survey on urban mobility patterns (ISFORT, 2008) has in fact shown that the share of short run displacements (< 5 kilometres) in urban areas has decreased by nearly 11% in the period 2001-2007, while that of medium run displacements (> of 5 and < 50 kilometres) has increased by nearly 10%.

⁴ Car density reaches the highest values in the cities of Napoli (4,707 cars/km²), Torino (4,296) and Milano (4,070). Lower density is found in Palermo (2,444), Firenze (1,934), Bologna (1,448), Genova (1,225), Roma (1,010).

reconciled by simply building new roads and parking lots, since, on the one hand, there are substantial limits to the development of new infrastructures, as a result of a lack of space and siting opposition (European Commission, 2007), and, on the other, car traffic tends to expand to fill up new capacity where it has been supplied. An increasing need is therefore highlighted to carry on those measures aimed at controlling and influencing mobility patterns and modal split and at modifying collective priorities regarding the use of urban spaces.

3.1 Traffic demand management and regulatory measures

The scenario previously described has led at local level to the introduction of command and control measures, with various attempts to limit car traffic: starting with the introduction of pedestrian areas, moving to daily traffic bans and circulation of alternate number plates (recently re-proposed), leading to the widespread implementation of ZTL (*Limited traffic zones*) from the second half of the Eighties (Zatti, Pasquarelli, 2006).

Such Limited traffic zones are areas of towns, generally concentrated in the historical Centres, where the use of cars without specific permits is banned during certain periods, with the aim of reducing congestion and air pollution, while stimulating the use of more environmentally friendly alternatives. In the Italian context, they were firstly introduced in large urban areas (Milan, Turin, Florence, Bologna) and progressively extended to medium and small sized cities: according to the survey carried out by Legambiente (2007) they are now implemented in more than 90% of total provincial capitals, with an average extension of 4 squared metres/inh. and a maximum value of 45,61 in the city of Bergamo.

The Italian experience, initially based on paper permits and manual enforcements, has been characterized by some of the usual drawbacks associated with regulatory instruments (Fontana, 1999).

Firstly, there have been significant difficulties in checking and sanctioning any irregularities that emerged: high percentages of illegal access into car-free areas were found in important Italian cases, demonstrating the restricted ability of existing limits to really influence travel behaviour. A more effective enforcement could have been achieved with wider use of traffic policemen, but their presence at each gateway for the entire day would determine high costs in terms of staff employed as well as in congestion and loss of time in accessing the restricted area. Typically, this has determined a progressive weakening of measures, with the diffusion of a (more or less conscious) tolerance towards irregularities, which has made restrictions in some cases little more than formal.

Furthermore, it has rapidly emerged how complicated (and rigid) it is to establish a clear-cut distinction between those submitted to restrictions and

those that could be exempt for economic or social reasons – the so called qualified demand. The problem has been frequently handed over, with a strong element of arbitrariness, to municipal offices that, besides adding new costs in terms of money and time, have generally shown a political weakness to resist different demands, so that the number of exempted and authorized subjects⁵ has progressively grown. In the same direction, another factor of flexibility has been represented by the choice of the duration, which is in some cases limited only to a portion of the daytime⁶ (Tab. 1).

Finally, concentration of policies in historic centres⁷ has caused negative effects (rebound effects) on the surrounding residential areas, displacing problems, but not solving them. A circumstance favoured by the necessity of increasing the accessibility to such areas, mainly through the construction of new car parks, in order to compensate local communities and pressure groups for the introduction of restrictions in the inner part of the city. From this point of view, limits seem to have mainly represented attempts to preserve the great cultural, artistic and tourist value of historic centres, rather than policies able to relevantly influence mobility patterns in the whole urban area. A consideration strengthened by more recent dynamics of mobility patterns which show a progressive reduction in the role of the city centre as an attractor of traffic and the development of models characterised by many origins and many destinations.

As a result, the overall attitude toward access limitations is at present fragmented and cautious (ISFORT, 2007), with a diffuse attention to the necessity of implementing complementary and even alternative measures.

3.2 Automatic vehicle identification

A first and important attempt to evolve from the problematic picture illustrated above has been represented by the introduction and testing of automatic control systems in order to render restrictions binding and to free human capital for other urban functions: after a long period of technical and

⁵ Generally derogations include: motorbikes, ecological vehicles (electric, methane, hybrid), taxi, rented cars, resident population, disabled, retailers, public administrations and public utilities, doctors, emergency vehicles.

⁶ A sort of trade-off seems to emerge in case studies between the territorial dimension of the ZTL and the temporal duration of limitations.

⁷ The nature of limitations, which introduce a hard separation between car users “in” and “out” prevents their application on wider area. In the largest share of Municipalities the dimension of the ZTL is less than 1% of the territory; in Rome it is about 0,5%, in Genova 0,3%, only in Florence it is higher than 3% (Tab. 1).

normative⁸ uncertainty, their application has become widespread in the main Italian cities to punish irregularities (Tab. 1), showing a great reliability in the processing and identification of vehicles.

Tab. 1 Automatic vehicle identification systems in largest Italian cities

City ZTL dimension (% of municipal land coverage)	Hours of limitations	Operational System	N. Gates
Milano (1) 0,2 km ² (0,11%)	24	Passive	22 (1)
Torino (2) 1,1 km ² (0,85%)	3	Passive	9
Genova (3) 0,64 km ² (0,26%)	24	Passive	11
Venezia-Mestre (4) 0,27 km ² (0,20%)	24	Passive	4
Verona 0,83 km ² (0,40%)	4	Passive	8
Trieste 0,15 km ² (0,18%)	24	None	
Bologna (5) 3,7 km ² (2,63%)	13 24	Passive Passive	9 (ZTL) 13 (reserved lanes)
Firenze 3,70 km ² (2,63%)	12	On Board Unit (Telepass)	15
Roma (6) 5,81 km ² (0,45%)(1)	11 (3 in Trastevere)	On Board Unit (Telepass) Passive	23 (central ZTL) 10 (Tourist area of Trastevere)
Cagliari 0,79 km ² (0,92%)	4 1/2	Passive	2
Napoli 3,44 km ² (2,93%)	11/12/14	Projected installation within September 2008	
Palermo	9	Passive	5 (on trial)
Catania 0,21 km ² (0,11%)	24	None	

Source: elaborations on ISFORT, 2007.

- (1) Mainly used for the control of lanes reserved to public transport.
- (2) 25 new gates projected.
- (3) 10 new passive gates under installation.
- (4) 22 new passive gates under installation.
- (5) 25 new passive gated projected in the medium run.
- (6) 7 gates already installed have to be put in action.

This evolution shows how something which has been considered for a long time little more than a curiosity can give an important contribution into protecting in an effective way particular areas or zones (see Tab. 2 for some impressive outcomes), reducing illegal accesses close to almost zero and

⁸ Until D.P.R. 250 of the 22 of June 1999, in fact, fines could not be applied without vehicles being stopped by policemen: two elements which would have strongly reduced advantages of AVI systems in terms of labour saving and traffic speed.

saving money costs with respect to an effective human control. Furthermore, gates can supply many other functions (data collection and processing, real-time information on traffic flows, surveillance and prevention of crime) not immediately valuable in economic terms, yet important. In this perspective, it can be underlined how AVI systems have introduced excludability in the consumption of relevant local public goods – urban roads, urban environment, urban landscape: a necessary prerequisite to implement the user pay principle and to increase resource-use efficiency.

Tab. 2 Effects of the introduction of AVI systems in some urban areas

City	
Roma (1)	-15/-20% of accesses in the ZTL after the introduction of automated enforcement in 2001
Torino	-50% of accesses in the ZTL after the introduction of automated enforcement in 2004
Bologna	-20/-25% of accesses in the ZTL after the introduction of automated enforcement in 2004 -70% of access in the lanes reserved to public transport after the introduction of automated enforcement in 2004

(1) = 10% increase of motorbikes that are exempt.

3.3 The role of economic instruments

Even if automatic controls have played an important role in making restrictions more effective, the problems previously shown with regulatory measures have stimulated the implementation of pricing mechanisms to manage urban mobility in another direction.

This evolution is related to the (potential) ability of economic instruments to determine a disincentive to the use of private cars in a more efficient and flexible way with regards to regulatory measures (bans, temporal restrictions, alternate plates). On the one hand, in fact, they do not impose a rigid separation of users with or without permission, while inducing major changes in individual behaviour to those who derive less utility from private mobility. On the other, this flexibility can generally permit to extend areas involved in traffic demand management and to influence urban mobility on a larger scale compared to the effects of command and control instruments.

Two major courses have been experienced in this direction: the widespread adoption of parking pricing and the, more or less sophisticated, development of road pricing (area pricing) schemes.

3.3.1 Parking pricing

Parking pricing means that motorists pay directly for using parking spots and facilities (Litman, 2006). This can serve different objectives:

- to recover parking facility costs;
- to manage space use and reduce parking problems;
- to manage private mobility and tackle road use externalities;
- to raise revenue for any other purpose.

Generally, it is intended to achieve a combination of these objectives, even if this can be cause of potential contradictory effects (Zatti, Pasquarelli, 2006).

Parking charges have constituted in Italy an initial attempt to integrate and (in some cases) replace the ZTL policy. Since the beginning of the 90s a growing number of cities have in fact introduced the payment of parking slots, and fifteen years later nearly all the 110 Capitals of Italian Provinces apply some form of parking pricing within their territory. The main goals pursued have been the attainment of a more efficient demand selection (compared with normative bans) and the broadening of management policies beyond historic centres; furthermore, the widespread condition of financial shortage characterizing local governments and the associated revenue-raising expectations have represented an important impulse in the same direction.

This development has been carried out through the progressive increase of the total number of charged spaces (Tab. 3), which has brought about the extension of the payment to the city centre crown and semi-peripheral areas, with the object of catching the largest share of urban mobility and avoiding congestion diversion.

As a result, pricing currently represents the major measure implemented by local governments to regulate parking spaces, even if the general picture remains mixed. There are for example cases where reserved seats are still predominant (see Milano and Firenze), so that space management is firstly carried out through an ex ante definition of the qualified demand and afterwards through the use of the economic (dis)incentive for remaining categories. Furthermore, striking disparities in the supply of spaces emerge among different cities and macro-areas (Tab. 4): clear evidence of a very different attitude towards the instrument.

Tab. 3 Parking charge in main Italian urban areas

	Total charged seats		Inhabitants/ charged seats (2006)	Charged seats/ regulated seats (1) (2006)	Maximum on-street hourly tariff (2006)	Park&ride Spaces (2006)
	2001	2006				
Milano	13,330	47,509 (53% off-street) (2)	13.8	0,6	1.5 € (1,2 € in less central area)	16,063
Torino	58,436	65,453 (23% off-street)	27.4	15	2 € (1.5 –1.3 and 0.65 € in less central areas)	1,270
Genova	3,333	13,555 (29% off-street)	44.6	NA	2 € (Uniform tariff)	1,312
Venezia	5,665 (2003)	12,884 (66% off-street)	21.1	NA	1.5 € (1.-0,5 € in less central areas)	2,123
Trieste		4,604 (61% off-street)	45	4,6	0.8 €	826
Bologna	24,551	35,868 (29% off-street)	10.4	5,3	2 € (1.5 –1. and 0.5 € in less central areas)	1,343
Firenze	7,935	30,549 (14% off-street)	12	0,9	1 € (0.5 in less central areas)	846
Roma	51,710	86,750 (7% off-street)	29.4	NA	1 € (uniform tariff)	14,488
Cagliari		7,144 (42% off-street)	22.6	6,8	1 € (0.5 in less central areas)	4,300
Napoli	25,463 (2003)	31,758 (16% off-street)	31.3	NA	1.5€ (1.-0,5 € in less central areas)	1,900
Bari		9,160 (75% off-street)	35.9	5,3	NA	1,750
Palermo	3,185	20,495 (5% off-street)	32.9	NA	1€ (0,75.-0,5 € in less central areas)	1,802
Catania	3,100	8,000 (7% off-street)	38.2	3,1	0,72€ (uniform tariff)	500

Source: elaborations on AIPARK (2007).

(1) Seats strictly reserved to: residents, loading and unloading, disabled users, taxis, limit parking duration, other qualified categories.

(2) Off-street places can be in dedicated structures or in open areas separated from the public roads.

Tab. 4 Inhabitants/charged spaces

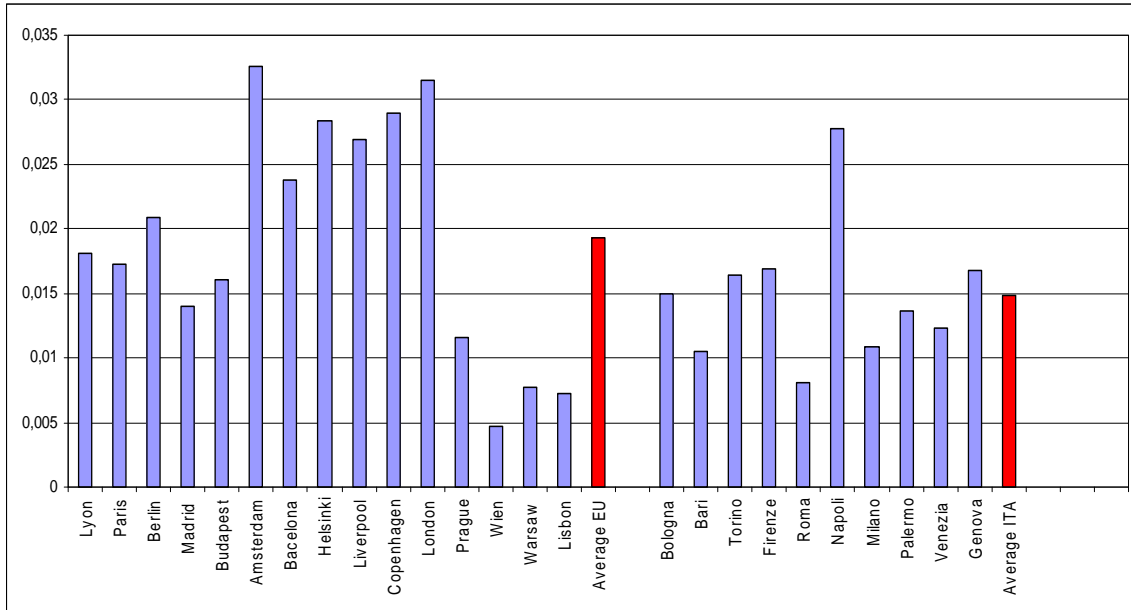
<i>City dimension</i>	<i>Min</i>	<i>Max</i>	<i>Average</i>
10-100 thousand inhabitants	7.2	127.5	38,47
100-300 thousand inhabitants	12.7	78.8	33
> 300.000	10.4	44.6	27,6
<i>Macro-Areas</i>			
North	9.8	95.7	25,94
Centre	7.2	94.4	32,19
South	9,3	127.5	52,27
TOTAL	7.2	127.5	35.53

Source: Aipark (2007)⁹.

⁹ Survey carried out on a sample represented by the 111 Capitals of Italian Provinces. Valid answers for 83 cities.

Even considering charging levels, there emerge on average an heterogeneous attitude, with the maximum hourly tariff for on-street parking ranging from a minimum of 0,5 euro to a maximum of 2.5¹⁰. Comparing data on a European level (Fig. 3), it can be shown how Italian cities are placed at a medium-low level, with still ample margins of manoeuvre for the future, above all considering the high pressure exerted by cars in main urban areas (Fig. 2).

Fig. 3 Benchmarking of parking tariff indexes in Italy and Europe (2007)



Source: elaborations on AIAPRK (2007) and Municipalities' web sites.

Note: values of hourly maximum charge divided by the regional GDP index (EU Level=100) on a NUTS 2 level.

With regard to charge structure, local governments have only partially attempted to introduce some forms of differentiations in order to better reflect the external effects caused by car use.

Few cities have in fact adopted variable tariffs according to the vehicle characteristics¹¹: actually, the most widespread measure is free parking for vehicles taking part to a car-sharing scheme (Torino, Genova, Venezia-Mestre, Bologna, Roma), while no differentiation is applied according to diverse Euro standard, due to the complex implementation and enforcement of such an articulated system.

More diffuse has been the tendency to develop spatial differentiations in order to discourage stopping and moving in more attractive and congested

¹⁰ 34% of Communes applies a maximum on-street hourly tariff lower than 1€; 56% between 1 and 2€; 10% higher than 2€ (AIPARK, 2007).

¹¹ In Bologna electric cars are exempted, while those methane-powered are granted a 50% rebate on the monthly pass.

areas: only ¼ of cities, in fact, adopts uniform tariffs throughout the territory, while in other cases higher values are generally applied in the city centres and in other nerve centres as commercial sites, tourist zones, hospitals; tariff articulation is however still modest and the development of a more efficient pricing system is clearly hampered by the administrative and transaction costs it is doomed to entail.

Another relevant issue is represented by the relationship between on-street parking and parking in dedicated spaces in the same city zone, since the latter could represent a better option from different points of view: lower congestion due to reduced space hunting, lower enforcement costs, lower tariff evasion, lower external effects on other urban users (pedestrians, bikers, tourists, retailers, etc). Off-street spaces actually represent a significant share of the total amount of charged sites (see Tab. 3): this requires that a consistent approach is adopted in terms of pricing, regulation and enforcement of corresponding on-street spaces. If the latter, in fact, are un- or under-priced, or if their management measures (being economic or regulatory) are not effectively watched over, few motorists will pay for off-street parking, so that the structure will be under-utilised and do little to alleviate parking and mobility problems. In the Italian sample, it emerges a jeopardized situation - where 23% of cities applies the same tariff level for on- and off-street, 24% higher tariffs for on-street tariffs and 22% for off-street ones¹²:- a figure which leaves ample opportunities for Communes to adopt charging structures which favour more sustainable behaviours.

All in all, the more recent approach of Italian cities shows an increasing interest towards parking pricing as an instrument of urban space management, but even a clear need to complete and better articulate its present functioning in order to guarantee a more consistent and efficient outcome. In this perspective, the ability of parking pricing to represent at the same time a good tool to manage public urban space and to regulate increasing flows of private traffic is subject to several conditions and pitfalls and leaves the door open to further developments.

This is true first of all as far as the primary aim of charging is concerned, which is generally directed at reducing parking time and at increasing the turnover of cars: an objective certainly desirable in terms of space management and territorial accessibility, but which can produce perverse effects on mobility, attracting new traffic and increasing total v-km travelled (Glazer, Niskanen, 1992). The few available data on the subject (ISFORT, 2007) show how parking pricing has actually generated a reduction in parking duration and an increase in cars' turnover: in the city of Bologna, for example, average parking time

¹² In the remaining 31% of Communes, no data are provided by the local authority and this is probably indicative of a scarce awareness about this issue.

decreased from 1h 28' to 1h 11' while the average daily cars x space have increased from 8 to 10. No monitoring is supplied on the concrete effects on the overall traffic inflow, so that the judgement on this specific issue remains incomplete.

Secondly, many difficulties relate to the actual ability of the economic disincentive to affect a large share of car users, since exemptions, exceptions and people who from one reason to another do not pay appear to be widespread. Besides through traffic, in fact, which can count for up to half of total traffic when the charged area is small, other categories of users stopping in the more attractive zones can avoid or mitigate payment and therefore are only marginally influenced by the instrument. It can be relevant, for example, the weight of the so called "qualified demand", a group of users to which a pass to park on-street is usually awarded at advantageous conditions. Residents, above all, can park freely in their residence zones¹³ in a large share (about 60%) of Italian cities (among them: Rome, Bologna, and Milan) and are everywhere granted annual pass at discounted rates¹⁴; also for other categories (doctors, loading and unloading, operatives, the disabled, retailers, public administrations) facilitations or exemptions are commonly adopted. The identification of a so large range of "qualified" categories, often established as a compensation for the spatial expansion of charged areas, can have an important influence on space and mobility management, reducing the incentive to modify individual choices. A recent survey carried out in Rome (Agenzia per il Controllo e la Qualità dei Servizi Pubblici Locali del Comune di Roma, 2007) has shown that, in a sample of 2400 on-street spots monitored in 2006, on average 73% is occupied by cars with a regular permissions, while only 16% pays to park (the other 11% being constituted by irregular parking); findings have been even more striking in Napoli where the share of permissions is more than 80% and where the ratio between the total amount of free passes for residents awarded and charged slots is around 1,2 and reaches 3 in some specific areas (ISFORT, 2007). In this framework, even if some of the commonly adopted special provisions can have strong economic and social justifications (as in the case of disability), a more accurate management and selectivity could certainly afford a better use of parking charges to restrict car possession and use.

Thirdly, the presence of private free spaces (hotels, garages, supermarkets, employer-paid parking), with regards to which, until now, no

¹³ In some cases (as Milano and Firenze) a hard separation is established, so that places are reserved only to residents, while in other cases residents are in competition with other users.

¹⁴ In the sample considered by AIPARK (2007), only 8 cities (less than 10%) apply an annual pass higher than 100€. In some cases (as Bologna, Venezia, Palermo) a higher selectivity has been recently introduced, so that a limited number of passes for single family is accorded (1 or more commonly 2).

serious attempts have been made to make regulations or economic incentives more operative, appears to be important, even though not adequately taken into consideration and quantified.

Fourthly, many local authorities have left the overall situation of parking costs in jeopardy, with the presence of a high number of free spaces even in central and semi-central zones where charges are adopted. This form of unpaid enclaves, which can amount to even more than the number of charged places, is generally intended as an attempt to maintain a high level of accessibility to inner parts of urban areas and to mitigate negative effects in terms of local consensus, causing an important effect on traffic attraction from outside and reducing the incentive to look to alternative means of transport from the beginning of the transport chain.

Finally, problems related to irregular parking (with no ticket, with expired ticket, outside of blue lines¹⁵) clearly emerge in Italian cities¹⁶, weakening the potential effect of pricing on demand (since probabilities to be fined appear very low), but also determining strong negative effects on general urban functionality. The high share of irregularities represented by cars parked outside of designated spaces (on the sidewalk, double parking, on bus stops, on mass transit lanes) can in fact be the cause of strong negative effects both on urban traffic efficiency and flows¹⁷ and create significant barriers to the mobility rights of transport disadvantaged categories (the disabled, women with prams, the elderly and children).

The overall outcome of these critical aspects cast doubts on the effectiveness of parking fees to adequately influence urban mobility patterns. The present use of parking charges, characterised by a concentrated spatial extension of the charged area, quite low level tariffs and the small share of road users involved¹⁸ (mainly occasional users, coming from outside) is hardly

¹⁵ Charged seats are demarked by blue lanes in Italian cities.

¹⁶ Even if the effective proportion of illegal parking is not easily quantifiable, it certainly assumes relevant weight, at least in some circumstances. For example, considering that in Milano the annual revenue x charged spot has been around 950 euro in 2004 while in Napoli it has been 33 euro in the same year (APAT, 2004), it can be realistically supposed that in the second case payment is little more than a formal provision.

¹⁷ A study carried out in the city of Milan (TRT, 2001) has shown the significant costs of undisciplined car users (double parking or parking close to road junctions):

- double parking determines a 5% increase in displacement time, a 22% increase in fuel consumption and a 9% and 15% increase in CO and NO_x emissions respectively.
- Irregular parking close to junctions determines a 9% increase in displacement time, a 13% increase in fuel consumption and a 21% and 16% increase in CO and NO_x emissions respectively.

¹⁸ A survey (Zatti, Pasquarelli, 2006) carried out at the edge of the charged area of a medium sized Italian urban area has shown for example how only about ¼ of cars entering the area are affected by parking payment, being others: through traffic (31%), private or employer paid parking (12%), users with permission (7%) and cars looking for a free space on street (24%).

consistent with claims to influence trip demand and to tackle urban congestion in an effective way. In this scenario, parking pricing emerges mostly as a revenue-raising instrument, potentially useful in making car drivers from the fringe area of the agglomeration, who generally do not contribute adequately to urban costs, pay for the use of the road network (and for other not excludable services), rather than an effective traffic demand measure.

Of course, actions to improve the effectiveness of parking pricing can be progressively developed – better enforcement, spatial extension as far as the boundaries of the city, reduction of special permissions, parking cash-out – but they can hardly result decisive. In this perspective, the opportunity to implement more effective and flexible forms of mobility pricing has to be carefully valued.

3.3.2 Electronic road pricing

Electronic road pricing, even in its simplest formulation, which involves charging drivers entering a specific area¹⁹, can play a relevant role in order to improve and complete the results until now obtained with parking pricing. In particular, it can contribute to amplify the effects on the overall mobility, influencing through traffic and drivers directed to private or not chargeable lots, while parking pricing helps to give an adequate representation of land opportunity costs and also influences car users making displacements inside the cordon. In this perspective, as recognised by the literature (Clathorp *et al.*, 2000), the use of two imperfect instruments is likely to improve the performance until now obtained with a single one.

In Italy, the first hybrid form of road pricing (*area pricing*) has been implemented by requesting to (some) ZTL permits holders to pay an annual fee. The main goal has been, on the one hand, to promote a more efficient demand selection, and, on the other, to mitigate the hard separation between categories authorized to enter to the regulated zone and those not authorized. To achieve this, a specific normative act was necessary (the so called “Street Code”: D.Lgs

¹⁹ Generally the term *Cordon pricing* is adopted when drivers pay a charge every time they enter the area. Examples of cordon charging are found in Norway (Oslo and Bergen), Singapore (after the implementation of electronic gates in 1998) and Stockholm. *Area pricing* implies that drivers are required to buy a license to enter a certain defined area for a certain defined period (day, month, year); it does not restrict how many journeys a license holder can make from and towards the area in the defined period. Schemes adopted in London, Roma and Milano operate as area pricing. With *Continuous pricing* a fee is charged according to the distance traveled (distance based charging) or the time spent within the cordon (time based charging). Only distance-related vehicle charges applied to lorries in Austria, Germany (on motorways) and Switzerland (on the whole road network within the country) operate on a continuous base.

285/92²⁰) in order to allow Municipalities to charge motor vehicles a fee when entering the limited traffic zones. Since that data several local governments (among them: Torino, Firenze, Palermo, Genova, Trieste, Roma) have introduced some forms of payment for well identified categories, generally applying low-cost annual passes (ranging, except the case of Rome, from 15 to 65 euro); more recently even daily payment permits have been established. Main experiences are described in Tab. 5.

Tab. 5 Forms of ac pricing in Italian urban areas

Roma	An Area licensing scheme is applied since 1998 to the central ZTL: an area of nearly 4,8 km ² which includes about 40.000 residents (1,5% of the total urban population). The scheme was initially based on annual paper permits, but since 2001 is managed through 23 automatic gates and the motorway tolling technology (Telepass). From Monday to Friday (6.30 am to 6 pm) and Saturday (2 pm to 6 pm) only permits holders are allowed to enter the restricted zone. The standard cost of an yearly permit, which can be obtained only by selected categories, is 550 euro; 200 euros for retailers and school boys takers; 55 euro for craftsmen (only 1 permit) doctors and Vatican. Residents pay 55 euro for a five-years permit (only the first car), 300 euro for a five-years permit for the second car and the standard annual rate for the third (and beyond). Permits are granted free of charge to disabled people, public transport and taxi; motor vehicles are not charged. From 2008 daily permits for special purposes can be obtained under request at the cost of 20 €. Revenues: 8 millions € in 2006.
Firenze	Area licesing scheme applied to the central ZTL (3,7 km ²). The standard cost of an yearly permit is 65 euro + administrative costs (around 70 euros/one off). Residents, domiciled and taxi pay only administrative costs. Disabled people: free of charge. Daily permits at 5 euros for selected categories.
Torino	Area licensing scheme applied to the central ZTL (1,1 km ²). The standard cost of an two-years permit is 50 euro + administrative costs. Lower tariffs for residents and few other categories.
Bologna	From May 2006, all categories previously excluded from the central ZTL can buy a daily permit which costs 5 euro or a four-days permit at a cost of 12 euros. A maximum threshold of 800 accesses x day is established. Permits free of charge are distributed to residents, taxis, governmental services and delivery or construction firms with business within the ZTL. Total permits issued are about 70.000 and give rise to about 40.000 daily accesses to the ZTL. From August 2006, commercial services has to pay to get the permit (previously free of charge); the cost of the permit is 25 euro if it is valid only for a single number-plate and reaches 300 euro for permits valid for any plate.

Schemes until now adopted turn out to be as a mix of area pricing and access restrictions. They can be likely interpreted as a first indication of the interest by local authorities to explore the implementation of new ad more sophisticated economic instruments in urban traffic management. Yet, it is clear how their present configuration strongly impacts on their potential effectiveness and requires future developments. Main drawbacks concern that:

- involved areas only correspond to the limited traffic zones, so that the pricing instrument is not exploited to expand the territorial coverage of traffic demand measures;

²⁰ According to the Italian law, pricing is at present possible only defining the area subject to pricing as a Limited Traffic zone (ZTL) and if the instrument is included in a wider package of interventions, approved within the Urban traffic plan. The Street code contains clear elements of contradiction, since it subordinates the adoption to the economic incentive to the presence of the regulatory instrument, while its role should be just that to go beyond the logic (and even the territorial dimension) of the ZTL.

- demand selection is not committed only to the economic levy, but is firstly carried out through an ex ante selection of the categories which can get permits; arbitrariness and conflictuality in the scheme administration seem therefore to remain;
- many categories are granted free passes, or pay only for the administrative costs, so that the overall effect on traffic-flows can result strongly weakened. In a survey carried out in Rome (Progress, 2003) it was found, for example, that only about 10% of daily accesses were on payment, being others free or exempted. The new regulation of the Rome area pricing, which has established since 2007 the payment of the permits for nearly all the selected groups (according to the tariffs described in Tab. 5) represents a positive attempt to extend the influence of the instrument and has actually brought about in only one year a reduction of authorised number plate of about 25%.
- even where permissions are issued on payment, the prevailing form of the annual pass, and even the very low level generally applied, reduce the marginal incentive to diminish motorised mobility and are a very rough representation of the true marginal external costs generated by urban traffic.

It is therefore to be hoped that these existing experiences correspond to the first steps adopted along gradual implementation paths which will lead to a wider and more effective use of the economic levy. In this direction the start off of the Milan Ecopass in January 2008 represents a fundamental sign which can pave the way to other cities in the medium-short run.

3.3.3 The Milan Ecopass

In 2002 the “Mobility and environmental agency of Milan” carried out a study, commissioned by the Municipality, which presented some possible scenarios (Tab. 6) for the introduction of road pricing.

One of the main outcome of the report was the clear trade-off with respect to area coverage between expected results, on the one hand, and feasibility, on the other: the application within the inner circle in fact was supposed to generate the lowest political opposition by retailers and pressure groups and to require the lowest level of investments directed to improve public transport, since the residual public transport capacity was estimated to be enough to accommodate users displaced by cars’ use; at the same time, this option would have produced negligible results in terms of traffic reduction and environmental improvements and even negative effects on area not covered by the charge. The enlargement of the application area would have proportionally improved

results, but even increased political resistance together with funds requested to provide additional local public transport services.

The 2002 study didn't go through in the application not only due to the opposition of specific categories and political parties, but even to the negative position of the bordering Municipalities, worried about the effects on their city-dwellers who systematically commute to the central city.

Tab. 6 The Options for a road pricing scheme in Milan (2002)

Area	Three hypothesis are delineated: The "Cerchia dei Bastioni": 7 km ² ; 76.000 residents, 64 gates required. The "Cerchia filoviaria": 29,2 km ² , 400.000 residents, 112 gates required. The municipal borders: 181 km ² , 1.308.000 residents, 59 gates required.
Design of the charge	Fixed amount for all the vehicles crossing the cordon between 7 am and 7 pm. Three charge levels were taken into consideration: 1, 2 and 3 euros. Exemptions: residents, emergency vehicles, motor vehicles.
Net revenues	Cerchia dei Bastioni: from 7,600 euros to 67,600 euros depending on charging level. Cerchia filoviaria: from 16,800 euros to 148,300 euros depending on charging level. Municipal borders: from 16,400 euros to 198,700 euros depending on charging level.
Technology	Electronic payment with the Telepass technology.

The possibility of introducing road pricing re-emerged in 2006, when the new major Letizia Moratti included the introduction of a form of road pricing in her political agenda and in the City's Urban Mobility Strategy. The configuration of the new scheme remained however vague, and no new detailed study has been made available by the local authorities. The only information included in the Urban Mobility Strategy was the intention to involve a large area (around 60 km² and about 1/3 of the city territory) and to configure charging in order to penalize more polluting vehicles.

The implementation process has been characterised since that data by a substantial lack of publicly available information and a high degree of politicisation, with the person of the mayor that has progressively acquired the role of a "project champion"²¹, committed to bridge differences within the complex and diversely motivated group of partners and to guarantee for the promises made to the local community. The political bargain within the centre-right coalition has finally brought about, at the data of the launch of the Ecopass (the 2nd of January, 2008), a substantial re-evaluation of the project, both in terms of territorial extent and of exempted categories (Tab. 7).

The primary and clearly settled aim of the Milan Ecopass, as revealed by its naming, is to reduce the environmental impact from road traffic through a marked fee differentiation by the vehicles environmental qualities ("pollution charge"). The reduction of congestion is only a sub goal since charges do not

²¹ For the relevance of the same concept in other international experiences see Leromonachou, 2007.

vary according to the traffic load in the application period²² and a large share of road users doesn't pay to enter the zone: actually only slightly over 40% of vehicles is affected by the charge.

Tab. 7 The Milan Ecopass: characteristics and first results (2002)

Area	8,2 km ² (4,5% of the city area); 77.000 residents (6% of the total urban population); 13% of total displacements occurring within the boundaries of the city of Milan.
Design of the charge	<p>Area charging with fixed tariffs for all the vehicles entering the area in working days between 7 am and 7 pm.</p> <p>Charge levels:</p> <ul style="list-style-type: none"> - <u>Class 1 vehicles</u> (LPG, Methan, electric, hybrid)= € 0. - <u>Class 2 vehicles</u> (Petrol cars and vans euro III and IV; Diesel euro IV with homologated particulate filters) = € 0. - <u>Class 3 vehicles</u> (Petrol cars and vans euro I and II)= € 2. - <u>Class 4 vehicles</u> (Petrol cars and vans pre-euro ; Diesel cars euro I, II, III, IV; Diesel vans euro III and IV; Buses euro IV and V)= € 5. - <u>Class 5 vehicles</u> (Diesel cars pre-euro; Diesel vans pre-euro, euro I and II; Autobus pre-euro, euro I, euro II and euro III)= € 10. <p>Annual passes for residents within the cordon: Class 3= 50 euro; Class 4=125 euro; Class 5= 250 euro.</p> <p>Frequent car users can buy a multiple-entrances card which grants a reduction of 50% for single access until 50 access and of 40% from 50 to 100 accesses; beyond 100 entrances the full charge is due.</p> <p>Exemptions: emergency vehicles, public utilities, disabled, public transport and taxi, motor vehicles.</p>
Technology	Electronic payment with passive technology.
Revenues	40 million euros (estimate). 3,2 million € monthly average in the first two months. It is provided that a part of net revenues is utilized to fund public transport enhancement, but no official statements about the share are available.
Effects	No temporal displacement effects have been pointed out, since traffic flows remain below the pre-ecopass level during all the day. Emissions reduction in the Ecopass area: -14% Pm10; -9% NOx; -7% CO ₂ .

The application assumes the form of an annual trial, after whom the final decision will be taken. This is consistent with many of the existing international experiences which have demonstrated how support improves with awareness of the scheme and when the positive impacts are visible and reported (CfIT, 2006). In the city of Stockholm, for example, the choice to carry out a six-months trial in 2006, coupled with effective payments and accompanying measures in terms of additional public transport services, has contributed to reduce public resistance and to induce a share of 52% of residents to vote yes in the subsequent confirmative referendum²³.

The overall characteristics of the Milan schemes and the first results obtained put forward some preliminary evaluations.

²² Except for the differentiation day/night and working days/non-working days.

²³ It is calculated that the share of favorable residents was close to 40% before the trial.

The first concerns feasibility. Road pricing is no longer a taboo, neither from a technical point of view, nor in terms of political sustainability, and can (and should) be evaluated without prejudice in the toolbox implemented to improve urban traffic management. Accordingly, the launch of the first road pricing scheme in Italy assumes a relevant symbolic value, since, on the one hand, it becomes part of a restricted group of international experiences, contributing to its definitive maturation, and, on the other, takes place in a national context where the supremacy of the auto-centric culture has been until now scarcely affected. In this perspective, though the scheme has been launched without an extensive informative and awareness campaign and has been supported above all by a strong political leadership, it becomes crucial that a focused marketing and media campaign is now carried out during the twelve-monthly trial, in order to improve the understanding of its operation and impacts and not to undermine its future development.

The second evidence is that the economic levy is effective. The relevant reduction of entrances by vehicles subject to the charge, even when a modest amount of 2 euro is applied²⁴, and the positive effect on local public transport patronage testify how a highly visible price (dis)incentive can strongly influence individual choice and stimulate more sustainable transport modes. With respect to parking pricing, road pricing can clearly affect a larger share of car users so that it remains a political choice to define who and how much to charge.

The third reflection induces to consider the present application as an intermediary step towards more complex and complete schemes. The underpinning idea, in harmony with practically all the EU projects dealing with these issues (Laird *et al.*, 2004), is that a step-by-step implementation is needed in order to allow people to get used to the new charging system and in order to find the right way to compensate the users that are negatively affected by the new system. In this perspective, the small portion of the urban area involved, the large share of untouched cars, and the foreseeable technological developments clearly render the current experience a starting point and not a final landing place. In particular, the choice to shape the scheme mainly as a pollution charging seems questionable and can be revised in the near future in order to better address the main (and growing) urban problems generated by cars, i.e congestion and land use.

A final relevant factor is the need to consider pricing instruments in the wider context of integrated policy packages, including: new public transport investments, improved infrastructures, information and awareness campaign, mobility management initiatives, compatible land use plans, etc.

²⁴ The share of class 3 vehicles has in fact a reduction by nearly 40%.

In this framework, public transport enhancements represent a commonly exploited opportunity to make the application of the economic levy more effective and accepted. Even in the case of Milan, the launch of the area pricing has been coupled with an intensification of collective services—about 4 million additional vek-km (+4,3%) scheduled in 2008 -, mainly concentrated in the peripheral sectors of the city and in the neighbouring Communes of the metropolitan area.

Less examined and taken into account is commonly the need to integrate pricing mechanisms within land use planning. The impact of road pricing on urban development is actually debated. Increasing mobility costs may in fact have a role in concentrating land uses and developments, encouraging over time a more dense pattern of settlements around trip attractors so that journey lengths are reduced; but they may also have, above all if the ring is small, an opposite consequence, inducing firms, commercial sites and population to move out the cordon (Banister, 2002). The overall outcome is therefore to be governed to make centralisation forces prevail, promoting infill, higher density, mixes uses and compact development patterns, i.e. a more sustainable urban structure. In the Norwegian city of Trondheim²⁵, for example, development control established that retail expansion outside the city centre were not permitted and, meanwhile, dedicated some funds from the charge to enhance the urban environment of the city centre (Ieromonachou, 2007).

It seems therefore necessary, as provided by the European “Thematic Strategy on Urban environment”²⁶ and the more recent Green paper “Toward a new culture for urban mobility”²⁷, that an adequate form of horizontal and vertical coordination between authorities is developed to help tackle the different challenges in an effective way. In Italy, Urban Mobility Plans have been formally introduced by the law in 2000, to stimulate local governments belonging to the same conurbation to ensure a common planning and organisation of the transport system (inter-municipal cooperation), and to integrate the decisions on the overall level and distribution of new developments with transport in order to reduce dependence on motorised movements and improve accessibility through collective services. The scarce results until now obtained under this point of view, testified by the predominance of segmented planning approaches, both spatially and sectorally, represent one of the major challenge to be tackled in the future, even for a successful implementation of pricing mechanisms.

²⁵ Where a cordon pricing has been operative from 1991 to 2005.

²⁶ COM(2005)718.

²⁷ COM(2007)551.

4 URBAN PLANNING AND THE ROLE OF SERVICES

The restrictions on the use of private cars through increased costs due to road pricing provide an important stimulus to the adoption of new technologies in guaranteeing urban mobility. It has to be considered that a larger use of walking and biking too could play an important role in guaranteeing mobility (with positive effects on health and a corresponding reduction in social costs). But it is quite clear that policy choices regarding mobility by themselves are unable to guarantee the achievement of an environmental-friendly city since the use of private cars is largely dependent from the structure of urban planning. In this perspective, most important are the choices regarding residential and working places; but equally important is the location of commercial sites

Services have played an important role in the discussions about the poor performance of the European economy during the nineties, since they are probably the main cause that helps justify the modest rate of productivity growth compared to the United States and, at the meantime, explain the lack of competitiveness of the European products in the globalised world market. But while the existence of this gap is unquestionable, it is important to remind briefly where lie the main factors explaining this relative productivity drop in Europe during the last period of time.

There are different figures regarding the evolution of productivity in Europe and the US, but everyone agrees that while Europe was catching up until 1995, the gap is again increasing afterwards. It is true that heterogeneity among European countries is more pronounced than the difference between the European Union and the US; in particular, there is a strong contrast in PC use per household and/or in the share of ICT expenditure between northern European countries and the so called "olive belt" ranging from Portugal and Spain on the west to Italy and Greece in the east. But the problem remains.

A good contribution to the explanation of the origin of the recent different productivity patterns has been recently provided by a study by O'Mahoney and van Ark²⁸, that allows to trace the evolution of productivity in different industrial sectors, divided into ICT-producing, ICT-using and non-ICT industries. According to this study there has been no productivity revival in the US industries that are classified as neither ITC-producing nor ITC-using. These industries are also the core of the European problem, exhibiting a deceleration in the late 1990s slightly greater than for the European economy as a whole. In ICT-producing industries there has been an acceleration after 1995 of 1.9 percent per year in the US and a similar 1.6 percent per year in Europe. The

²⁸ O'Mahoney, M. and van Ark, B. (2003).

core of the US success story appears to have been in ICT-using industries, i.e. retail, wholesale and security trading industries.

According to van Ark et al.²⁹ all the productivity growth differential of the US over Europe in the late 1990s came from these three sectors, with retail contributing about 55 percent of the differential, wholesale 24 percent and securities trade 20 percent. This performance of the US retail and wholesale trade sectors could be explained by many factors, including ICT investments, but it seems that the main factor has been the more productive new large stores offering a wide array of goods accompanied by low prices and a relatively high use of self-serving systems, which displayed much less productive existing establishments. Just as the US retailing sector has achieved efficiency gains for reasons not directly related to computers, including physical investments in a new type of “big box” organization, Europe has fallen back because European firms are much less free to develop the “big box” retail formats, even if relevant differences existing across countries should be considered. There are many reasons for this outcome. According to Gordon, “Europeans find abhorrent the hundred of billions that Americans have spent on extra highways and extra energy to support the dispersion of the population into huge metropolitan areas (...). Europeans enjoy shopping at small individually owned shops on lively central city main streets and pedestrian arcades and recoil with distaste from the ubiquitous and cheerless American strip malls and big-box retailers”.

If the diffusion of big boxes is one of the main reason explaining the rise of labour productivity in the US, it is also important to evaluate the environmental impact of this choice. In the US it is due to many features characterising American cities (low density of population, public policy favouring the diffusion of residential sites), but in Europe the structure of the cities is different (historical centres, constraints on the building of urban highways, preference for shopping in small shops in the pedestrian areas). Small shops are now disappearing also in Europe since prices for consumers are lower in the commercial sites, but external costs of mobility from the city centre to outside the urban area are not considered (more traffic with an ensuing increase in energy consumption, difficulties for old people, reduced security in the inner city through the closing of small shops).

If an optimal social outcome has to be pursued these costs should be internalised through environmental taxes. It is important to note that in many circumstances municipalities have a big interest in promoting the construction of big boxes in the urban area since municipal revenues are generally based on property taxes, and hence environmental costs are neglected. To internalize these costs one instrument that could be used are high parking fees in the big

²⁹ Van Ark, B. Inklaar, R. and McGuckin, R. (2003).

boxes levied by the municipalities corresponding to the external costs engendered by the traffic for reaching the commercial sites.

5 AN ENVIRONMENTAL TAX TO INTERNALIZE THE EXTERNAL COSTS OF TOURISM

The conservation of historical centres within Europe is endangered by an increasing flow of tourists. It is quite clear that they provide large benefits to private firms, but rising costs to municipalities. If these costs are not internalized, the global amount of tourism is sub-optimal. But the normal policy stance is targeted to cut down the costs for tourists in order to increase their number. The cash flow deriving from tourists expenditures is then increasing, while the burden put on the shoulders of municipal budget is exploding.

In the tourism sector there is either an excess demand – due to the underestimation of costs since only private costs are referred to in tourists' decisions – or an underfinancing of the conservation of the existing cultural and natural stock. In particular, foreign tourists contribute to the covering of the expenditures for the protection of the artistic, cultural and natural stock of a country only through the payment of indirect taxes on the goods consumed during their staying in the host country.

Some kind of benefit pricing is then convenient to let tourists contribute to the conservation policy. But in many cases this is not possible since a large part of the stock is free and cannot be paid for. In Italy, where a large share of the total world stock of artistic goods is placed, the traditional instrument for taxing tourism has been the “tassa di soggiorno”, that was levied on people living temporarily in hotels and other kinds of residence, but nationwide this tax has been dropped from January 1st, 1989. Nowadays, an example of this kind of taxation remains the Aufenthalts Abgabe introduced in Trentino-Südtirol in 1988 or the Taxe de Sejour existing in France. The idea is very simple. While the residents pay municipal taxes to cover the costs of services offered by the municipality, tourists can free ride except for services that require the payment of a price. For all the other services they benefit without paying.

A small tax for people living for some days in a hotel or in another residence could represent a partial contribution to covering the costs of the services enjoyed by tourists, and not only by residents. The negative impact on the number of tourists could be balanced by better services offered by the municipality. The introduction of a Tassa di soggiorno in the Italian cities has been recently proposed by 42 Mayors.

Another idea could be that of paying an enter ticket. This proposal seems particularly important for historical European cities where the number of tourists is largely higher than the number of residents. A typical example is Venice, where in parallel the amount of residents is decreasing and that of tourists is continuously increasing. In this case also the structure of the city – a group of islands with only a bridge connecting Venice to the mainland – could favour the payment of a ticket for visiting the city.

6 THE PROBLEM OF BIO-FUELS

The transport sector accounts for over 27% of total greenhouse gases emissions within the European Union and since 1990 transport emissions have been increasing by nearly a third. As an alternative to gasoline and diesel in this sector the EU has committed itself to increasing the share of bio-fuels from less than 2% currently to a minimum of 10% by the year 2020. The first remark on this point is that if the EU wants to achieve the goals fixed for bio-fuels an amazing amount of arable land should be devoted to this kind of production. Land use changes associated with the increase in production of feedstock for bio-fuels may speed up the destruction of natural habitats and reduce drastically the capacity of carbon sinks to capture carbon dioxide emissions. In particular, in some countries deforestation should be expanded on a large scale in order to increase the production of bio-fuels, with a direct impact on climate changes, as they release large amounts of carbon previously absorbed by rainforests or other habitats.

The implications for developing countries of the increasing demand for bio-fuels should be considered too. A trade-off between greener fuels and higher food prices has been assumed as likely, as large scale bio-fuel industries based on first generation technology will certainly increase agricultural commodity prices. Oecd warns of a possible increase of these prices between 20% and 50%. In 2007 the cost of cereals, that in most developing countries represent the basic food, has been increasing by 35%. The Fao has many times suggested that displacing food production could damage seriously food security in developing countries. In the 82 Low-Income Food-Deficit Countries the Fao estimates that the food bill has increase for the second year by 35% - even if the import amount has been reduced by 2%. Within this group the most disadvantaged are African Countries whose imports have become more expensive by 50%.

Facing the rally of energy and food markets the countries depending from abroad in these fields are damaged extensively and their population suffers from malnutrition in the percentage of 30%. According to the Fao there are at least 22 countries, half of them are sub-saharian countries. The Fao Food Price Index has increased by 23% in 2007.

Furthermore, increasing bio-fuels production could potentially reduce freshwater availability for alternative uses, since water is a resource of strategic importance in the development of bio-fuel feedstock production. Finally, the distortion in the use of arable land would be rich of consequences since the ensuing change in the costs of animal feed would raise the prices of dairy and poultry products.

From an economic point of view, even if bio-fuels have the potential to reduce greenhouse gas emissions (albeit limited to 3% according to the Oecd), far greater reductions could be achieved for the same amount of money by purchasing the reductions on the marketplace. In any case, bio-fuels should not be supported through subsidies, but by adopting technology-neutral policy, for instance implementing technology-neutral carbon taxes. In the EU this would mean phasing out subsidies to bio-fuels amounting to at least € 3.7 billion in 2006³⁰.

In conclusion: the use of bio-fuels could cut down CO₂ emissions, but in terms of efficiency its application in electricity and heat production rather than in road transport could improve greenhouse gases reductions per unit of land required for growing the feedstock. While an increased use of bio-fuels could have a negative impact on land acidification, require a larger utilization of pesticides and fertilizers, and endanger bio-diversity, there are plenty of other instruments that could be employed to guarantee a reduction of greenhouse gases emissions. They range from increasing fuel efficiency and exhaust emission reduction to the progressive electrification of cars, for instance in the form of hybrid cars, and facilitating the transfer to more sustainable modes of transport such as public transport or railways. A recent international survey among climate experts has shown that they expected bicycles to have more potential than first generation bio-fuels in reducing carbon emission without unacceptable side effects.

³⁰ Behrens, A. (2008).

7 ENVIRONMENT AND AGRICULTURAL POLICY

Land conservation is largely dependent from agricultural policy. Good farming practices are very important for environmental purposes. They should correspond to the type of farming that a reasonable farmer would follow in the region concerned, which entails compliance with existing statutory environmental requirements. Agriculture could add to greenhouse gas problems through nitrous oxide emissions from soils, mainly due to nitrogen fertilisation; methane emissions from intestinal fermentation and other emissions from manure management. But agriculture could also provide carbon sinks to capture carbon dioxide emissions. Development of renewable, agricultural biomass could contribute to reductions in emissions from energy and transport, while benefiting the agricultural sector.

Soil degradation processes such as desertification, erosion, decline in soil organic matter, soil contamination, decline in soil biodiversity and salinisation can cause soil to lose its capacity to carry out its main functions. Such degradation processes can result from inappropriate farming practices such as unbalanced fertilisation, over-abstraction of groundwater for irrigation, improper use of pesticides, use of heavy machinery or overgrazing. An intensive use of land from one side and climate changes from the others favours desertification with a relevant impact on the potential of alimentation of many poor countries. This implies that an adequate price policy must be backed by taxes hitting more heavily environmentally unfriendly modes of agricultural production and that measures for controlling climate changes are particularly important in environmentally fragile areas like Africa.

8 CONCLUSIONS

In this paper we have tried to discuss the role that different instruments of pricing policy could play in promoting an efficient use of land, that is becoming a more and more scarce good through time. The main area where pricing instruments should be employed is the transport sector, particularly in urban areas. A growing experience has been accumulated during the last years and pricing for the use of roads, either through parking fees or through electronic road pricing has been experimented in many countries with results that seem encouraging.

One important conclusion that emerges from our analysis is that notwithstanding these positive results pricing policy for the use of roads is a necessary condition for getting efficient results, but by itself is not sufficient. Equally important is the need to integrate pricing mechanisms within land use planning. Increasing mobility costs may in fact have a role in concentrating land uses and developments, encouraging over time a more dense pattern of settlements around trip attractors so that journey lengths are reduced; but they may also have, above all if the ring is small, an opposite consequence, inducing firms, commercial sites and population to move out the cordon. The overall outcome is therefore to be governed to make centralisation forces prevail, promoting a more sustainable urban structure.

We have examined two other instruments that could support such a positive outcome. The creation of big boxes, that is commercial sites outside city centres, are positive for consumers since prices are lower, but these prices don't internalize environmental costs generated by heavy traffic flows from the city centre. A right price should include these costs through an equivalent parking fee. In the European cities, that keep the characteristic of the past in terms of monuments and urban structure, the flow of tourists brings about high private revenues, but big social costs mainly through congestion of the transport system and waste generation. These costs should be covered by tourists to guarantee an efficient social outcome through the payment of an equivalent municipal tax.

Another sector where the problem of an efficient land use planning is strategic is agriculture. Here there are two challenges to a sustainable environment: population growth and the concentration of an increasing share of population in urban areas; and the use of arable land not for the production of food, but for growing agricultural products that can be used as a feedstock for bio-fuels in order to reduce the dependence of transport sector from fossil fuels. The environmental benefits of this recent evolution are not so sure. What is sure is the negative impact on food prices and the limited availability of these products facing an increasing demand for food. According to John Beddington - the new scientific advisor of the British government - the food crisis will hit our world before the climate changes crisis. Are we back to Thomas Robert Malthus forecast in the 19th century that nature will not be able to provide a sufficient amount of food to a growing amount of population? In any case, the social unrest mounting in many developing countries around scarcity and raising prices of food is a first signal of the high priority that must be attributed to this problem.

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