LONDON CONGESTION CHARGING AND URBAN TOLLING IN CHILE: CONTRASTS AND LESSONS ON FAIRNESS AND PROJECT FINANCE

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Abstract

Congestion charging has been considered for many years as a good way of correcting imperfections in the urban travel market and generating revenue for transport investment. However, two main considerations have delayed its implementation: its possible regressive nature and its claimed lack of favour with voters. The London Congestion Charging (LCC) experience has proved that neither of these objections is sufficiently valid and opens up a new avenue for innovative sources of finance for urban transport.

The paper considers also another pricing mechanism for the provision and allocation of transport infrastructure: tolling of roads. It is fair to say that tolling has been much more widely implemented than congestion charging. It is true that the main drivers behind congestion charging and tolling of roads appear to be different: in one case the correction of market imperfections and in the other a way of building, financing and operating new infrastructure.

This paper explores both streams of pricing and financing transport infrastructure and services, and compares them from several points of view: equity, efficiency in resource allocation and as source of funds for investment, and finally voter acceptability.

The paper contrasts the case of London with that of Santiago in Chile where an extensive system of urban toll roads has been adopted. It also draws material from the experience of H 407 in Toronto, Melbourne City Link in Australia and other humbler toll road concessions focussing on re-building and maintaining infrastructure.

The paper concludes that both approaches (congestion charging and tolling) may well converge in the future with significant benefits for infrastructure provision and resource allocation.

1. CONGESTION CHARGING AND TOLLING

1.1 Introduction

The case for congestion charging was first made over 40 years ago by the Smeed Report (1964) in the UK. Smeed observed that the general structure for motoring taxation dated from 1909 with a fixed element (unrelated to road use) the annual Road Tax and a variable element related to use through Fuel Tax. Smeed noted the ineffectiveness of this method to

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reflect the real costs of undertaking a particular journey, in particular costs incurred by others. Congestion generates significant externalities that lead to major waste of energy and time unless internalised through a pricing mechanism.

Since Smeed's Report experts have advocated the adoption of road pricing mechanisms based on congestion and able to discriminate location and time when congestion takes place. Two main considerations have delayed implementation of congestion charging. The first one is its possible regressive nature: the rich will pay and benefit from faster travel whilst the poor will have to use inferior modes of transport. The second objection, perhaps a more important one, is that voters will find congestion charging an unacceptable form of taxation. The London Congestion Charging (LCC) experience has proved that neither of these objections is sufficiently valid and opens up a new avenue for innovative sources of finance for urban transport.

However, congestion charging as in London is not a very efficient form of revenue collection nor a sensitive enough mechanism for internalising congestion externalities. Toll roads, on the other hand, are perceived as primary sources of revenue to pay for infrastructure. Toll roads have successfully been implemented in most countries, most notably in Latin America. The methods for toll collection have improved significantly in recent years with the implementation of open road electronic tolling in Canada, Australia, Israel and now in Chile. These methods for revenue collection could also have an efficient role in internalising externalities.

The rest of the paper looks at the strengths and limitations of tolling and congestion charging, using examples from London and Chile to give it more immediate policy relevance. The lessons learnt from both congestion charging and tolling are drawn at the end.

1.2 User charges and road pricing

The economic theory underpinning road-use pricing was first put forward by Pigou (the father of welfare economics) in 1920, with Walters (1961) relating it specifically to road traffic.

They basic issue is that road users do not perceive the true costs of their journeys, they only perceive direct costs (fuel) and charges (tolls, parking) and therefore the decisions they make are sub-optimal. In order to improve resource allocation (including route and mode choice) it is necessary to expose traveller to the true (social) marginal costs of every section of their journeys. In general terms, it is important to price externalities to transport services as well as incorporate the cost associated to the provision of infrastructure. Poor travel choices arise because the marginal private costs perceived by drivers are significantly less than the marginal social costs incurred by society.

In order to correct these cost distortions we have several tools at our disposal, not all of them equally good at influencing behaviour:

a) General taxation
b) Road Licence
c) Land tax
d) Parking charges
e) Fuel tax
f) Tolls (inter-urban and urban)
g) Congestion charges/road user charges

It is worth focussing on two aspects of each of these tools. First, how effective is each of these measures at correcting distortions at the location and time when congestion and road use takes place. Second, how efficient is the measure for collecting funds in a particular way; this is not a secondary consideration: whilst wasting time in congestion is very wasteful (there is not much else you can do with queueing time) money collected from fuel taxes or tolls can be put to alternative and better use, even within the transport sector.

General taxation, for example can be collected efficiently but has a minimal impact on travel behaviour. The collection of a Road Licence or other methods to tax the ownership of a vehicle through an annual charge may have some impact on vehicle acquisition but may in turn encourage vehicle use (given the large sunk costs in car ownership the marginal cost of using it is perceived as low). The imposition of a land tax to capture some of the benefits of a new transport scheme, say a new metro line, has some impact on the business response of land developers but affects trip making only in an indirect way. All of these forms of taxation can ensure that revenue from vehicle ownership and use covers the costs of providing (and maintaining) roads and their complementary services (e.g. guidance and signage, enforcement, emergency services). In fact, it is often argued that revenue from taxation, including fuel, more than covers these costs; note however, that these costs do not include externalities.

Fuel tax is a very efficient way of collecting revenue for the state; it also influences travel behaviour through higher operating costs. However, fuel tax is a very blunt instrument in that it corrects prices in the same way at congested locations and in the middle of an empty country lane; under-corrects in the first case and over-corrects in the second.

Parking charges (and tax) can influence travel behaviour but in a rather imprecise way: through traffic is unaffected and charges are related to parking duration not congestion. Of course, user charges like fares and tolls, are a more direct way of collecting revenue and these can be made to relate very directly to the use of a transport facility. However, the usual focus in them is simply to collect revenue to cover investment and operating costs, not the correction of market distortions. We are going to explore later on in the paper, to what extent their use can be extended to cover price corrections as well and how best to achieve this. But in general terms, the only measure designed specifically to rectify prices is congestion charging: a price correction applied where externalities are most onerous, e.g. congested conditions.

1.3 Congestion charging

Singapore was the first country to adopt congestion charging in the form of a paper based Cordon or Area Pricing in 1975. The immediate impact was a significant reduction in car traffic, congestion and increase in public transport patronage. In 1998 the paper-based system was replaced by better targeted electronic one with further reductions in congestion and traffic.

There were also several studies and trials in the UK and elsewhere but in 1986 the city of Bergen in Norway introduced a flat rate to enter the Central Business District from 6 AM to 10 PM Monday to Friday. Oslo, Stavanger, Trondheim and other cities introduced similar systems. The selling point of these Norwegian systems was the collection of revenue for further investment in transport.

The introduction of the London scheme in 2003 represented a major breakthrough both technically and politically as it has been hailed as a success in a world city. Schemes that were previously studied and shelved like Hong Kong, the Netherlands, and Seoul are new being revived and considered again.

All the implementations so far have been of rather simple systems. When a charging area is defined as in London, drivers pay a single fee to travel on it for the whole day. This discriminates very little in terms of location and time of congestion. Cordon systems as the ones in use in Norway and Singapore, can charge every crossing of the boundary and can discriminate at different times of the day and therefore be able to price externalities more accurately.

Today, more complex systems have been proposed, some involve multiple cordons with differential charges as in Edinburgh, others charge by distance travelled in each particular area and time. It can be said that the experience of Norway and London Congestion Charging demonstrated that voters are not always opposed to these methods provided they are reasonably simple and generate revenue that is invested back into transport. Herein lie two problems: simple schemes are perhaps too coarse and unable to price externalities well enough, and in order to generate useful net funds the revenue collection system must be efficient, i.e. not too expensive. Part of the answer to these questions may come from advanced toll road systems.

1.4 Toll roads

Charging for the use of roads to finance their construction and maintenance has operated in many countries for over 300 years. The Turnpike Trusts, originally set up in 1706 in the UK, led to serious outbreaks of rioting in which toll-gates were destroyed - largely because the population objected to paying tolls for travel on roads which had previously been free. Nevertheless, the Turnpike Trusts were a success, and the money raised was used to finance the building of new and better roads and between 1750 and 1800, the average journey from London to Edinburgh was reduced from twelve to four days.

Despite objections, toll road concessions have been a very active form of investment in new roads in developed and developing countries. There are fairly developed networks of toll roads in the US, Canada, France, Spain, Italy, Australia. Some emerging countries have also adopted the tolling of roads as means to provide badly needed good quality infrastructure. Mexico, Brazil, Argentina and Chile have developed extensive systems of toll roads whilst South Africa, Indonesia and China are developing their own.

Most of these facilities use real tolls. Countries like Britain and Portugal have made extensive use of shadow tolls where the payment is made by the government and not the user. Obviously, these fall outside the scope of this paper as they are only ways of financing infrastructure over a longer period of time.

Tolling was applied originally mostly to the provision of new roads (or at least doubling existing capacity) but in recent years Argentina and other countries have awarded concessions to reconstruct, improve and maintain existing roads, without significantly adding to their capacity. These schemes were resisted more than tolling new roads but did not generate the disruption encountered by the Turnpike Trust 300 years ago.

One of the differences between a toll road and an untolled one is the need to provide facilities to collect money from users. This often result in large and expensive toll plazas in different sections of the new road. In order to reduce delays and toll collection costs, automatic toll collection lanes were introduced, accepting coins, pre-paid tokens/cards and normal credit/debit cards. The use of accounts linked to an electronic tag further speeded up tolling transactions.

Since the introduction of free-flow electronic toll collection (ETC) in Highway 407 in Toronto, a new range of payment methods became practical for tolling roads. Implementations followed in Melbourne and Israel as well as an alternative fast lane in other roads, for example in Puerto Rico. Free-flow (or more accurately called Open Road) toll collection introduces a new rafter of issues to toll collection, in particular the view of the user as a client (this is also true for the use of ETC with barriers as well). Integration, customer service, interoperability and what to do with infrequent users and violators become significant aspects to consider when designing and implementing such systems.

Open Road ETC offers important advantages to toll road operators but it is particularly attractive for implementation in urban areas where there is no space for toll plazas. Moreover, OR-ETC generates no delays and reduces emissions as it permits non-stop operations; a very attractive proposition in congested and polluted urban areas.

2. THE LONDON CONGESTION CHARGE SCHEME

We only summarise here the main features of the London Congestion Charging scheme. The system was introduced in February 2003 and requires all vehicles entering a central area between 7:00 AM and 6:30 PM (see Figure 1) to pay a daily fee of £5.00 (around € 7.30 or CAN$ 11.50; residents in the charged area have a 90% discount). Payment can be made in a number of ways and failing to do so before midnight of the day of travel incurs a £100 fine, reduced to £50 if paid within 14 days.

2.1 Behavioural responses

The results of the experience so far, may be summarised as follows:

- Congestion charging was introduced successfully and without the problems predicted by many commentators; LCC was quickly part of moving in London.
- After some initial teething troubles the operation and enforcement of the scheme are now working well
- New travel patterns were rapidly established and have remained stable since;
- Vehicular traffic in the charging zone has decreased by 15% and congestion (measured as the extra time spent travelling during the day compared with uncongested night conditions) reduced by 30%
- Bus level of service benefited most: service irregularity fell by 30% and disruption due to traffic delays were reduced by 60%, bus speeds increased by 6%;
- The greatest shift of demand went to bus use (38% increase in passengers in the peak, around half of them due to the congestion charge)
- There were perceived environmental benefits and the impact on the local economy seems to be minimal although research by Steer Davies Gleave suggests there may be some changes in the use of properties close to the boundary.

There was significant investment in new buses to improve services. Of the ~70,000 car trips that are no longer made to the charging zone around 55% have transferred to public transport, ~25% now divert around the zone and ~20% have changed trip timing, frequency or destination. Suburban rail traffic remains broadly unchanged and the underground (metro) has seen a small reduction in traffic due to other influences. There was an increase in taxi and two-wheeler usage (motor, scooter and pedal-cycles).

Figure 1 London Congestion Charging Zone

The changes in behaviour have been somewhat greater than expected. Indeed, there is a shortfall in revenue because more people than originally envisaged decided to avoid the charge by changing mode, route or the trip altogether. Our models underestimated travellers' responses. They were based on good modelling practice and sound Stated Preference surveys. It appears that the SP and models underestimated the "difficulty to pay" factor. Paying the congestion charge is indeed very easy and there are many accessible ways of doing this; however, it still needs some action, even if it is just sending a mobile phone message or paying at the newsagent with your newspaper. This has a deterrent effect that SP does not seem to capture.

This poses an interesting problem to future feasibility studies: how best to capture the real behavioural traits that will define changes in trip making and revenue collection?

2.2 The limitations of LCC

A key lesson of the London Scheme is that a clear political will and a major effort in communicating the case for congestion charging as means to increase investment in public transport go a long way to secure public support. Ken Livingston was elected Mayor of London on the clear understanding that he was to introduce Congestion Charging and he was re-elected after its implementation.

One of the reasons for the "success" of LCC is its simplicity: one cordoned zone, one price. The technology is simple and well proven, although enforcement still requires a good deal of manpower and manual intervention. But simplicity is also a weakness, both in terms of appropriateness of the charge and as a source of finance for urban transportation.

In principle, drivers should pay for the marginal social costs they generate when using a road. Therefore, they should pay more if there is more congestion and less at other times. The coarse nature of LCC means that some drivers are paying too much for a short journey in and out the charging zone whilst others would be paying too little for multiple trips in the area. This disparity means that some drivers are too deterred from using LCC and the outcome is a system that is less fair and generates less revenue than should be the case.

A better match between pricing and marginal social costs would require a more demanding technology, for example the use of tags on vehicles linked through contracts to forms of payment like credit cards or bank accounts. This could be coupled to a greater range of charging points not just the "charge or nothing" nature of a zone. This issue is also related to the costs of charging. The Automatic Number Plate Recognition (ANPR) used in London is simple and proven technology but it is also an expensive (and inefficient) form of revenue collection: the operating costs of the scheme consume over half of the revenue collected. Advanced "open road" electronic toll collection schemes like Melbourne City Link in Australia use ANPR only for enforcement purposes and to identify users of a more expensive DayPass. H 407 in Toronto charges a CAN $3.35 premium for users without a tag whose tolls are collected via ANPR.

The LCC is a fairly coarse congestion pricing mechanism. There is only one charge and it applies to a single area, all-or-nothing, from 7:00 to 18:30 and is nil outside these boundaries. The externalities of congestion, however, do not vary in this way. It may well be that London may extend the charging area and upgrade the system to tags or other electronic means to reduce and diversify collection costs in the future.

3. ADVANCED ETC IN SANTIAGO, CHILE

3.1 The Santiago schemes

Santiago de Chile is a city of some 5 million people and one million cars. The government has granted five urban toll road concessions (one is mostly a tunnel) and is about to grant one more. These will provide the largest part of investment in new road infrastructure in the city. The whole system will operate using European standard inter-operable technology for open road ETC. The network is shown overleaf and toll collection started in section of the North-South facility in December 2004 and so far the system is suffering from remarkably few teething problems.

Santiago has been considering road pricing (rather than congestion charging) for over 10 years, mostly on environmental grounds. Air pollution is a serious problem in Santiago and restrictions on the use of cars using the number plate method (two digits per day) are in operation for most of the year. Despite the general use of catalytic exhausts, as car ownership is growing at a rate higher than income growth, the problem can only get worse.

All the concessions will have a similar tolling structure in terms of charge per km and differential charging at different times of the day and as a function of regular congestion. There are three levels of charging, approximately 5, 10 and 15 US$ cents per km. The second level applies to peak periods and the third when speeds consistently drop below 50 Km/hr and in order to keep the roads free-flowing. In practice, all concessions adopted an open tolling system with gantries located at key points to maximise net revenues.

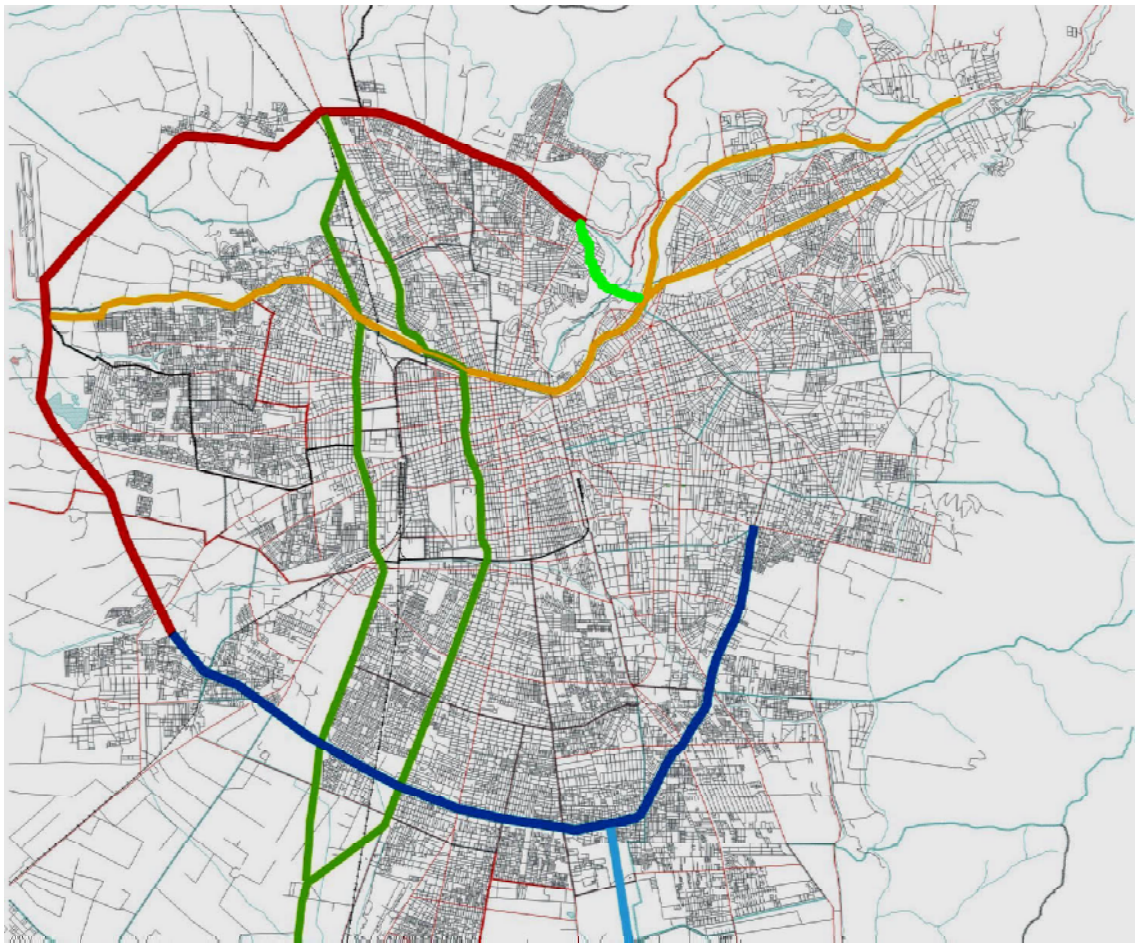

Figure 2 The Santiago ETC network

The charging structure can be quite complex to understand as it changes per section of the road, time of day and day of the week (although there are no changes in real time as in some HOT lanes in the US). A typical scheme is shown in Figure 3 for the North South concession, the first one to start charging.

Section	Direction	2006					2010					2015					2020				
		AM	FP	PT	SA	DO	AM	FP	PT	SA	DO	AM	FP	PT	SA	DO	AM	FP	PT	SA	DO
1	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
1	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
2	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP
2	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
3	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
3	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
4	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
4	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
5	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBP	TS	TBFP	TBFP
5	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
6	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBP	TBFP	TBP	TBFP	TBFP	TS	TBP	TS	TBFP	TBFP	TS	TS	TS	TBFP	TBFP
6	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBP	TS	TBFP	TBFP
7	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TS	TBFP	TBP	TBFP	TBFP	TS	TBFP	TS	TBFP	TBFP
7	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBP	TBP	TBFP	TBFP
8	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBP	TBFP	TBFP	TS	TBFP	TS	TBFP	TBFP
8	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TS	TBFP	TBFP	TBFP	TS	TS	TS	TBP	TBFP
9	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
9	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
10	NS	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
10	SN	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
11	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP
11	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBP	TBFP	TBFP	TBFP
12	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
12	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP
13	NS	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP
13	SN	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TBP	TBFP	TBFP	TBFP	TBFP	TS	TBFP	TBFP	TBFP	TBFP

AM: Morning Peak FP: Off-Peak PT: Evening Peak SA: Saturday DO: Sunday

Figure 3 Charging for Santiago ETC, yellow indicates peak and red congestion charges

It is clear that this differential charging is not related to the provision of infrastructure. It is more closely related to the opportunity to extract more revenue when the rest of the network is also congested and also part of a general marketing strategy: "when you pay for your road you get a good level of service". This is where road tolling and congestion charging find common ground.

3.2 Implications

The toll road concessions will offer a new opportunity in the next few years. One of the requirements of the six contracts with the government is that the concessions must distribute over one million tags free of charge in Santiago. The full system will be operational in 2006 but even before then the great majority of vehicles in Santiago will have a tag and a contract linking it to a form of payment. The concessionaires are already discussing how to use these tags to pay for other services and the introduction of congestion charging in critical parts of the untolled network seems a natural extension. The distribution of revenues between concessions and government is not a problem because the system will cater for an advanced clearinghouse system already.

One of the advantages of the extensive Santiago system will be that few of the fairness considerations will arise on the expenditure of the monies collected. The tolls clearly go towards paying for the new infrastructure and any congestion charge revenue could be spent on a wide range of projects and locations filling in gaps in resource allocation.

Moreover, drivers are already becoming accustomed to use a system with variable pricing where although the charges are known in advance they are collected in a way that creates a distance between collection and payment. In this sense, the charging scheme is analogous to mobile phone charges. Collecting tolls through tags and accounts costs a fraction (less than 5%) of the revenue; it is a much more efficient method for revenue collection.

This suggests the idea of using this good revenue collection method to charge for other road sections that may be congested, even if they were not built to be funded by tolls. Santiago would have a low cost and efficient method for road pricing that could be extended outside the ETC schemes. To be acceptable, it would need to show that the additional charges on congestion hot-spots will generate revenue that will be re-invested in transport. But there are plenty of good transport projects to invest in Santiago, in particular the badly needed bus infrastructure needed to make of the new bus system, Transantiago, a success.

4. CONVERGENCE AND CONCLUSIONS

We may well see a convergence of two different approaches, one designed to correct for externalities (road pricing) and the other designed to fund new road systems. As a good deal of the political acceptance of read pricing relies on the generation of funds to invest in other transport projects, the efficiency of revenue collection becomes a key implementation issues.

Moreover, ETC is also a more refined tool for charging for congested roadspace. The experience in Santiago shows that the technology is easily adopted in emerging countries and that users understand it as easily (or otherwise) as mobile phone charges.

It can be argued that all these ideas are applicable only in very special cases, for example London and Singapore. Only a small proportion (12%) of travellers to the centre of London travelled by car before LCC. Moreover, the city is going through a period of exceptional economic and creative energy and therefore the impact of congestion charging on business has been minimal. Other world cities have already investigated the success of LCC and are considering introducing their own schemes. These will have to be adapted to their local conditions, political constraints and what is considered acceptable and fair.

Santiago has no claim to be a world city but is peculiar in that a very extensive ETC network was successfully developed over very few years. Other cities like Buenos Aires have partial toll road networks (mostly on their accesses) but the introduction of open road ETC generates new and interesting opportunities to improve and build new roads in them.

Ultimately, it will be a matter of the transport policy and political leadership in each city. The most successful transport schemes of the last few years are almost exclusively due to inspired and inspiring Mayors like Linvingston, Lerner and Peñalosa.

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